MODERN PLASTICS

FEBRUARY 1960

PHOTOGRAPHED FOR MODERN PLASTICS BY ALAN FONTAINE

PLASTICS IN THE PRODUCT REVOLUTION: Electric shavers *p. 100*

Futures in reinforced plastics *p. 83*

Sandwich 'without' core *p. 92*

Urethane foam—the quick way *p. 107*

High-heat-resistant acrylic *p. 127*

PRODUCT-DESIGN BRIEFS FROM DUREZ

- **Fire-safe umbrella roof**
- **Plastic for toughest electrical jobs**
- **Where to get ideas**

Speaking of Stability

This is one piece of a small roomful of high-class electronic hardware.

The hardware represents man's latest and most sophisticated effort to cram into 123 square feet of floor space the means of discovering in one day which of 15,000 small semiconductors will work in a given set of circumstances, and which ones won't.

STROMBERG-CARLSON

This piece carries the semiconductor through the test gantlet. Around and around it goes, over six electrical-test hurdles, through an oven at a blistering 200°C, and back again for another trip.

Few materials have what it takes to survive this merry-go-round with virtually no change in size, shape, strength, toughness, and insulation values. Here you see one that does—a Durez diallyl phthalate molding compound filled with glass roving.

This is just one of the family. As a class, Durez diallyl phthalate compounds offer unsurpassed freedom from cold flow and creep, high reproducible arc resistance, a chilly indifference to moisture.

You get more information on them by talking over the intended application with your molder. He can describe them far more glowingly than do our data sheets, which we'll gladly send you.

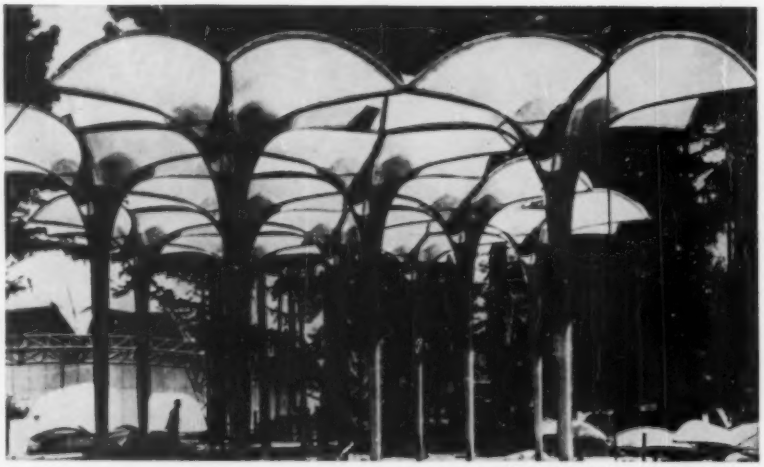
Symbol

When promoters of the American National Exhibition in Moscow displayed a cross-section of America in old Sokolniki Park under flaring umbrellas of glass fiber and Hetron,® they built even better than they knew.

For the tapering 16-foot columns arching into 15,000 square feet of fire-resistant roof, architect George Nelson used our Hetron polyester. One of the reasons: Hetron does not support combustion; it requires no additives, as do other polyesters, to make it resist fire.

Another reason: strength. Structural engineers learned that winds in Moscow sometimes reach 60 mph. So they tested five of the lily-like umbrellas at Mitchell Field, N. Y., by blasting them with 60-plus-mph gusts from the twin propellers of an Air Force bomber.

The payoff: a coup for the U. S. when a sudden Moscow storm caused aluminum arches to buckle badly in the sparsely attended Soviet exhibition next door. In the jam-packed U. S. showcase, Hetron stood fast.



Fabricated by Lunn Laminates, Inc.

Idea Starter

That's the virtue of our modest little bimonthly bulletin, *Durez Plastics News*. It starts ideas.

It discusses products, from closures to computers, from plastic portholes to potentiometers. It shows you how Durez plastics are used.

Though its scope is the whole world of products and product design, you can read it through in 10 minutes. Thousands of people tell us it helps them keep up to date, in an age when keeping up to date can be a full-time job.

We'd like to send *Durez Plastics News* to you. May we? If you'd like to receive it regularly, just check the coupon.

For more information on Durez materials and services mentioned above, check here:

- ☐ Data file on Hetron, including list of fabricators
- ☐ Diallyl phthalate molding compounds (data sheets)
- ☐ *Durez Plastics News* (bimonthly bulletin)

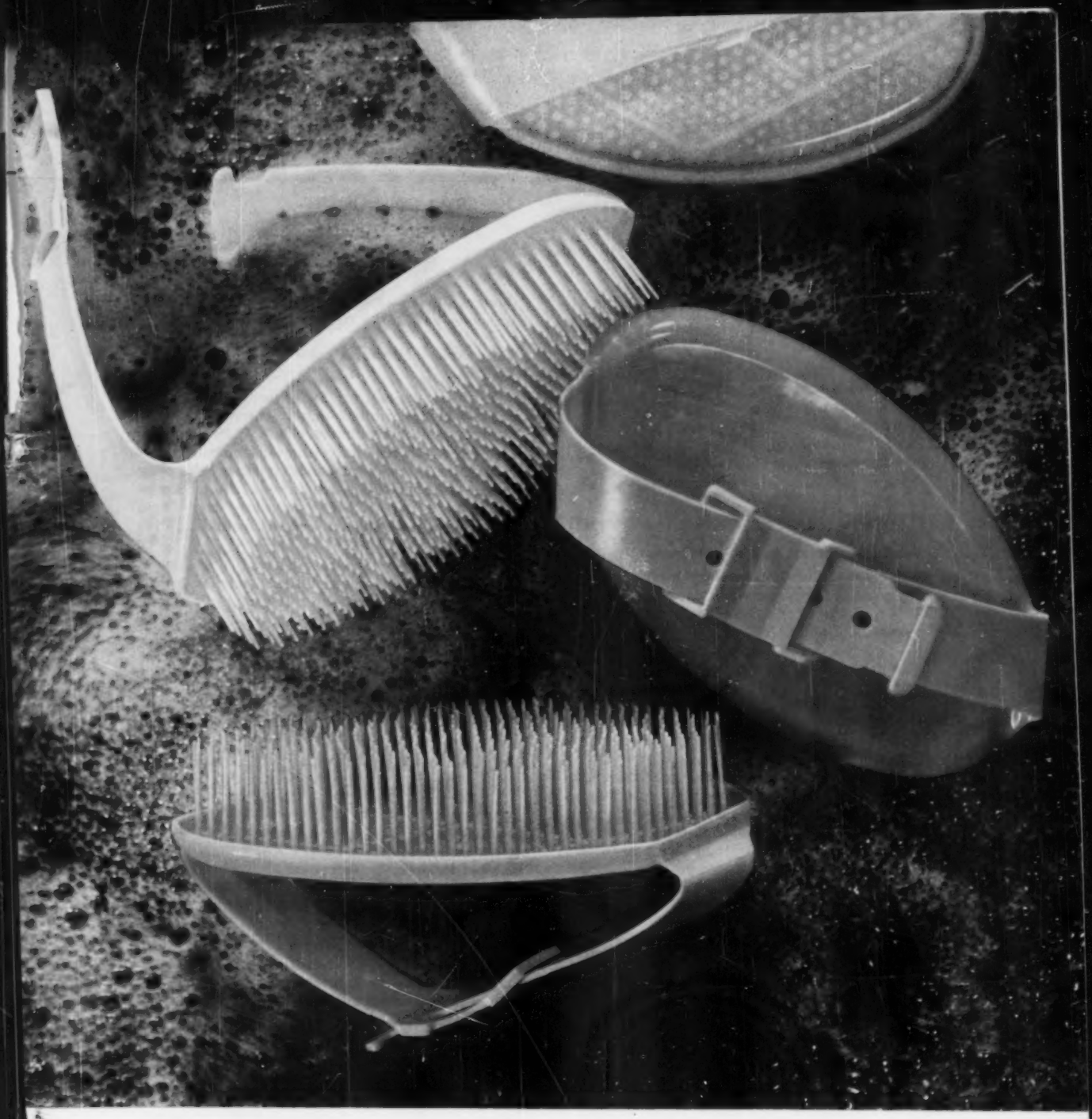
Clip and mail to us with your name, title, company address. (*When requesting samples, please use business letterhead.*)

DUREZ PLASTICS DIVISION

1202 WALCK ROAD, NORTH TONAWANDA, N. Y.

HOOKER CHEMICAL CORPORATION

HOOKER CHEMICALS PLASTICS



Catalin POLYETHYLENE...preferred for premiums

Only low-density polyethylene could supply the unique range of properties to accomplish the three basic requirements for these bath brushes*—a rigid back, a flexible strap and still more flexible bristles—all molded in a single shot.

Colorfully and attractively designed for the premium field, they are molded of unbreakable CATALIN Low Density POLYETHYLENE ..as the preferred material... in order to couple low cost with outstanding resistance to soaps, detergents and hot water.

CATALIN POLYETHYLENE is available in the widest range of densities, from .915 to .96, with melt indexes from 0.2 to 50, to fulfill every requirement. The full roster of Catalin plastics also includes Polystyrene... in general purpose, high impact, heat-resistant, light-stable and anti-static grades, Styrene Copolymers, Nylons and the new Polypropylenes. Maintaining the highest standard of laboratory-tested product purity, Catalin offers molders, blow molders and extruders the widest variety of top-quality, cost-favorable formulations to fit their specific needs. Your inquiries are invited.

*Molded and marketed by Simon Greenblatt & Son, Inc., 509 Manida St., Bronx, N. Y.

Catalin Corporation of America Catalin **One Park Avenue, New York 16, N. Y.**

MODERN

THE PLASTISCOPE

Section 1 ..... **39**

Section 2 ..... **206**

Vinyl chloride industry is expanding (p. 39); Export of U.S.-produced polyethylene (p. 208); Teflon 100 now commercially available (p. 41); Du Pont announces 7¢/lb. reduction for Delrin (p. 43); European plastics shows (p. 210).

EDITORIAL

We need continuing public relaticns .. 264

In their clash with entrenched interests, the growing plastics industries will come under strong attack. Why we need a permanent public relations and promotional effort.

GENERAL

Reinforced plastics — how they have done, where they are headed 83

Total sales of reinforced plastics amounted to a quarter of a billion pounds in 1959, up 42.5% over 1958. Where did it all go? Presented here is an incisive analysis of the nine major end use markets, giving the extent of reinforced plastics' penetration and reasons for their acceptance in these fields. Forecasts for 1965 outline the new patterns of distribution to be expected for the half billion pounds of reinforced plastics that will be produced by then.

No sweat with foam jacket 89

Bothersome condensation problems on galvanized water softener tanks have been overcome with jackets of molded expandable polystyrene foam. Had sheet metal jackets with standard insulating materials been tried, die costs would have been prohibitive in relation to volume.

ABS shells save $14 per firing 90

Molded re-usable projectiles are now being used, at less than a penny per firing, by all branches of the United States Armed Forces to train mortar men. This development represents a further expansion of plastics' penetration into the ballistics field and may lead to the adoption of similar devices in training programs involving other weapons, both large and small.

Sandwich "without" core 92

New process involving modification of the lost-wax technique, and originally designed for making radomes, permits laminate sandwiches to be built in one operation, core and skins together. The technique has proven so economical that a major airline is using it for virtually all the plastic laminate sandwich structures on its jet liners.

New resin-gun system speeds reinforced plastics boat production 95

By designing polyester for one particular type of spray equipment, manufacturer saved plant space, labor, and resin, improving his competitive position in the burgeoning boat market.

Why mop maker turned to PE 96

In a major product redesign program, large producer of mops switched from metal to polyethylene. Result: 25% labor savings, 50% weight reduction, lower material costs—and a better product for bigger sales.

Light cable for tough jobs 98

Whether for stage lighting or mine service, PVC jacketed cable stands up under rugged conditions. Important savings in weight bring significantly reduced labor costs, increased production.

Plastics in the product revolution: electric shavers 100

From drab black and brown phenolic housings of the original Schick, 19 manufacturers of electric shavers are now using a wide range of plastics—both on the inside and out—to bring improved appearance and operation. This brief history traces the development of electric shavers over the past 30 years.

Everybody needs epoxies 102

Nos. 17 and 18 in our continuing series on epoxy resin applications deal with the fields of a) road surfacings and b) floor toppings, respectively.

Safe roads that last 102

Tops in floor topping 104

Modern Plastics Executive and Editorial Offices: 575 Madison Avenue, New York 22, N.Y. Please mail all correspondence, change of address notices, subscription orders, etc., to above address. Quotations on bulk reprints of articles appearing in this issue are available on request.

Phone: PLaza 5-2710
TWX: NY 1-3063
Cable Address: BRESKINPUB

Printed in U.S.A. by Hildreth Press, Inc., Bristol, Conn. Member, Audit Bureau of Circulations. Member, Associated Business Publications. Modern Plastics is regularly indexed in the Applied Science & Technology Index and Industex.

PLASTICS*

FEBRUARY 1960
Volume 37 Number 6

• ENGINEERING

One-shot urethane foam 107
Special catalyst that eliminates one production step from conventional foaming processes brings potentially large savings to foam manufacturers. *By W. E. Erner, A. Farkas, and P. W. Hill.*

Do-it-yourself polarized light tester .. 114
An easily built instrument (cost: $56) helps the polyethylene injection molder to eliminate internal stresses and the PE film maker to check product for various impurities. *By D. W. Pugh, W. F. McDonald, and W. V. Funk.*

How to measure and control static charges on plastic webs 120
A novel static electricity detecting head specificially suited to the plastics film and laminating industry permits rapid determination of extent of charging. Steps to eliminate electrostatic charges are outlined. *By T. F. McLaughlin Jr.*

• TECHNICAL

A new acrylic thermoplastic 127
By polymerizing alpha-methylstyrene and methyl methacrylate, a transparent thermoplastic material with good outdoor weatherability and heat resistance of over 250°F. is obtained. Properties and processing variables are covered. *By Charles H. Schramm and Joseph Briskin.*

Polymer coatings on magnet wire ... 134
Techniques described in this article can determine the presence or absence of discrete enamel layers, their number and thickness, and the degree of symmetry of the enamel build. *By Gerald W. Recktenwald and Daniel M. Trollinger.*

Flexural strength of polymethyl methacrylate at various deflection rates . 138
Flexural strength is not readily predicted from axial-load data. Tests are described correlating data from axial and bending loads as strength criteria. *By Richard E. Ely.*

Pressures on imbedded objects 142
Values of pressures between an object embedded in fully cured resin are shown to correspond well with values obtained on the theory that the pressure is solely due to different coefficients of thermal expansion of the materials. *By Glenn H. Dewey and John O. Outwater.*

• DEPARTMENTS

Letters to Modern Plastics 46
Where our readers sound off

New Machinery—Equipment 48
What it can do, how much it costs

World-Wide Plastics Digest 54
Condensations of significant articles published in other magazines

U. S. Plastics Patents 58
Issues on new materials, processes

New Developments 148
New ways to use plastics, new design, and new product concepts offer ideas you can use for increased profits

Literature 156
Brochures and books that can help you

Manufacturers' Data 197
Check-off postcard brings booklets gratis

Companies . . . People 236
Promotions, appointments, relocations

Classified Advertisements 254

Index to Advertisers 260

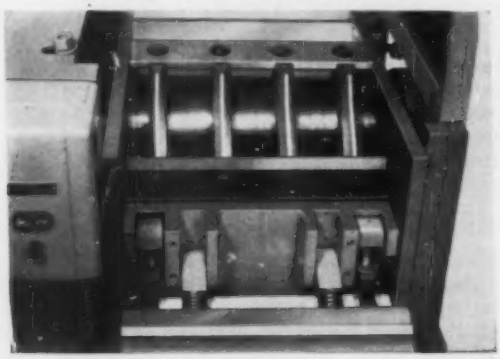
Coming Up . . .

Plastics' growing penetration of structural application markets has made the subject of plastics sandwiches of vital importance to the industry. In our March lead article will be presented a comprehensive survey of such sandwiches, covering kinds, applications, and methods . . . Engineering lead spells out advantages of tumble finishing thermoplastics, tells how it's done . . . Technical section will carry results of a rheological study of PVC calendering resins . . . Other March features include the full story of why Ford switched to polyethylene side shields and how they are made . . . Complete details on the Engel process of making large pieces with low-cost tooling, just being introduced to this country . . . In later issues we'll have an article on the Thermos bottle redesign . . . How the Disabled Veterans of America saved $1¼ million by switching to plastics . . . what vacuum hopper extrusion can do for processing PVC dry blends . . . Plus our monthly series on Plastics in the Product Revolution.

Modern Plastics issued monthly by Breskin Publications Inc. at Emmett St., Bristol, Conn. Modern Plastics Encyclopedia Issue published as the second issue in September by Plastics Catalogue Corp. at Emmett St., Bristol, Conn. Second class postage paid at Bristol, Conn. Subscription rates (including Modern Plastics Encyclopedia issue), payable in U. S. currency; in United States, its possessions and Canada, 1 year $7, 2 years $12, 3 years $17; all other countries, 1 year $25, 2 years $45, 3 years $60. Single copies 75¢ each (Show issue, $1.00; Encyclopedia issue, $3.00) in the U. S., its possessions and Canada, all other countries $2.50 (Show issue, $3.00; Encyclopedia issue $6.00).

Contents copyrighted 1960 by Breskin Publications Inc. All rights reserved including the right to reproduce this book or portions thereof in any form.
*Reg. U.S. Pat Off.

FIVE NEW
Cumberland
Large Throat
GRANULATING MACHINES



PART OF THE COMPLETE LINE OF CUMBERLAND PELLETIZERS, BESIDE THE PRESS AND CENTRAL GRANULATING MACHINES, DICERS, CHOPPERS AND PRE-BREAKERS

LARGE THROAT OPENINGS — 12" x 16" (Shown above). Also 7" x 10", 8½" x 12", 8½" x 16", 12" x 20".

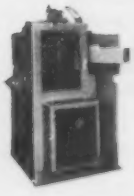
QUALITY CONSTRUCTED entirely of steel weldments. Advanced design leaves all working parts readily accessible for cleaning and adjustment of knives.

NEW PERFORMANCE — New knife design and slow rotor rpm provide better granulation and quiet operation. Clean cutting of the complete range of thermoplastic materials from softest polyethylene and vinyls to hard and tough nylon, Cycolac, and Kralastic.

MINIMUM FLOOR AREA — Desirably compact for central and beside the press applications.

CUMBERLAND PELLETIZING MACHINE

New feed roll mechanism provides better control of extruded strands of plastic materials. Cuts cubes or pellets 1/32" to 1/2". 14" and 24" openings.



STAIR STEP DICER

Produces perfect cubes or pellets 1/16" to 1". Two standard sizes accommodate up to 7" and up to 14" ribbons.

Write now for literature

DEPT. 1 • BOX 216, PROVIDENCE 1, RHODE ISLAND

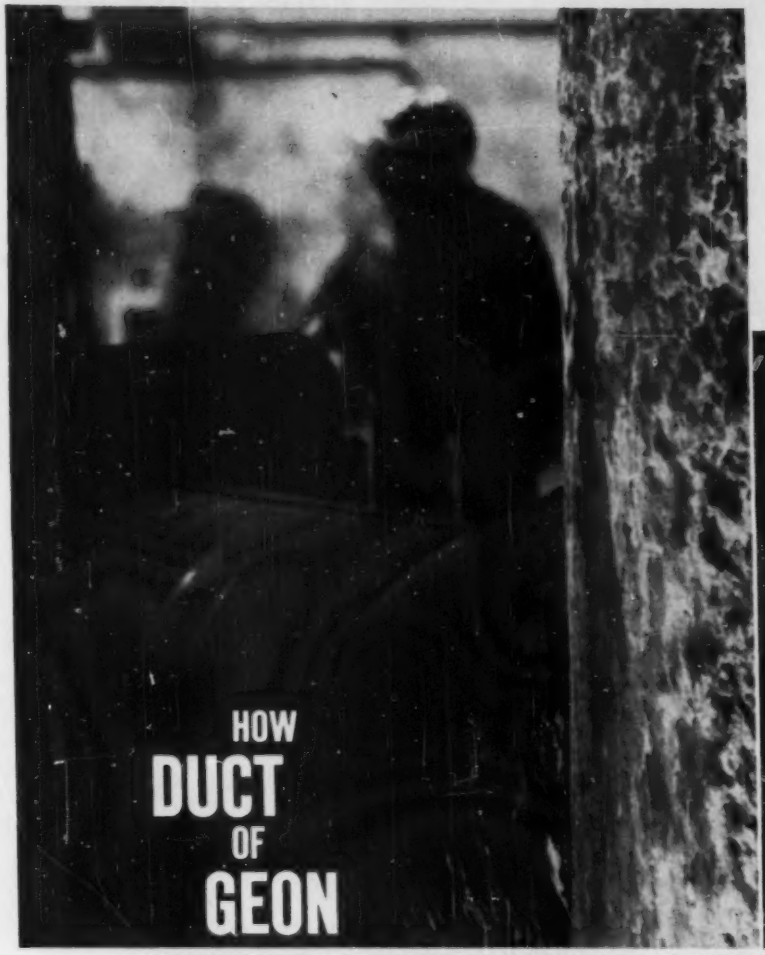
Direct factory engineering assistance available throughout North America from sales offices in Providence, New York, Cleveland, Chicago and Los Angeles

FOREIGN LICENSEE — BURTONWOOD ENGINEERING COMPANY, LTD.
Burtonwood, Warrington, Lancashire, England
Sole Manufacturers and Distributors outside North and South America

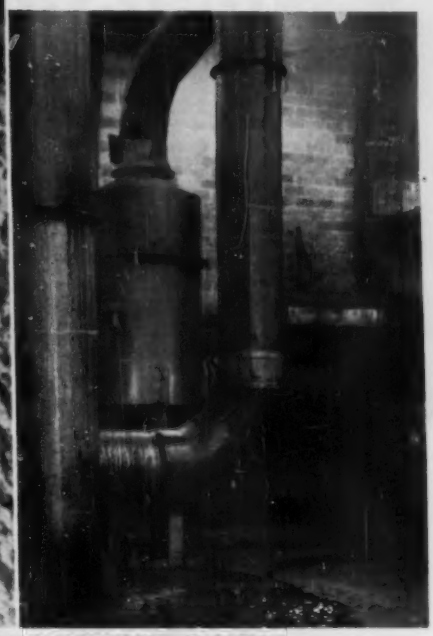
Cumberland
ENGINEERING COMPANY, INC.

Another new development using

B.F.Goodrich Chemical *raw materials*



The large duct shown here was fabricated of Geon vinyl by Colonial Plastics Mfg. Co. through their distributor, Gould-Kramer, Inc., Cleveland, Ohio. B.F.Goodrich Chemical Company supplied the Geon vinyl.



CONQUERS CORROSION IN CHLORINATION ROOM

A tougher corrosion problem than this one would be hard to find. That's why all the large round duct you see is fabricated from rigid sheet made of Geon vinyl.

This room is where spent gases are carried from chlorinating operations to storage tanks. The atmosphere is such that personnel must wear goggles and face masks at all times. Corrosion would make short work of most ductwork or pipe.

But Geon is unaffected by acids, oils or many hydrocarbon chemicals. It is easy to fabricate, light in weight, and simple to install. Duct, pipe—even complete fans and valves—made of Geon are solving corrosion problems throughout industry.

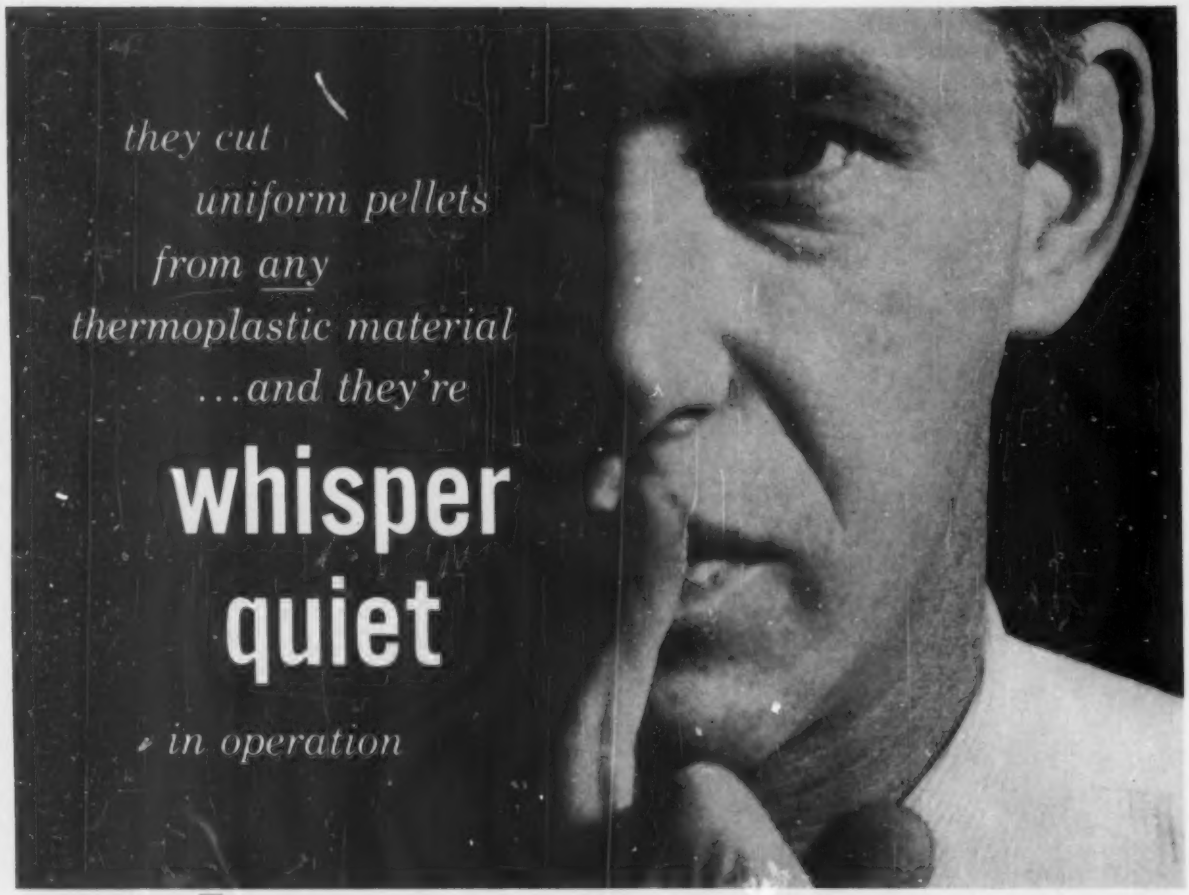
For more information on products made of Geon vinyl—or on this versatile material itself—write Dept. GJ-2, B.F.Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

Geon VINYLS

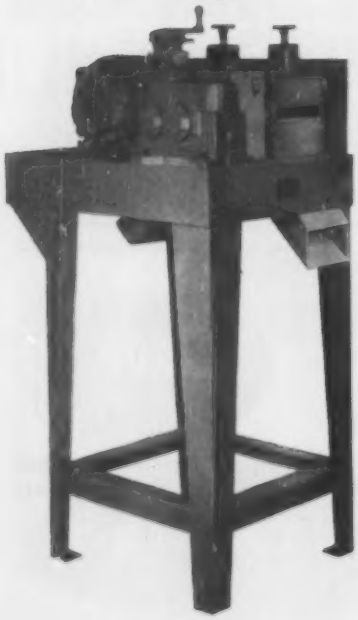
B.F.Goodrich Chemical Company
a division of The B.F.Goodrich Company

B.F.Goodrich

GEON vinyls · HYCAR rubber and latex · GOOD-RITE chemicals and plasticizers



NEW B&J PELLETMASTER PELLETIZERS



Hard, brittle plastics . . . soft plastics . . . the B & J Pelletmaster handles these and all other thermoplastics with the same quiet efficiency—making uniform pellets every time. Stainless steel feeding, cutting, and discharge chambers – including knives and rotor – for easy, fast maintenance!

Operation couldn't be easier than with a Pelletmaster. Rotor speed is synchronized to feed rolls which are geared for variable speed operation conforming to the rate of extrusion. Speed control is truly reliable!

And, only the B & J Pelletmaster is "whisper" quiet. It operates at lower noise levels than any other pelletizer on the market. There's no chatter or clatter . . . no distracting noises!

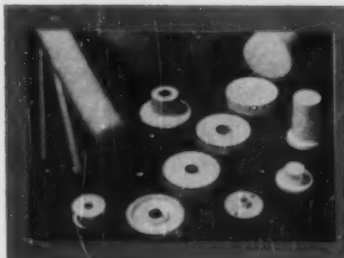
The Pelletmaster is available in two models: the Pelletmaster 7 with 7" wide pelletizing chamber, 3 H.P. vari-speed drive; and, the Pelletmaster 12 with 12" wide pelletizing chamber, 5 H.P. vari-speed drive. Surprisingly attractive prices on both models! Write today for illustrated brochure and quotation.

GRANULATING MACHINERY • LEADERS IN • SINCE 1895

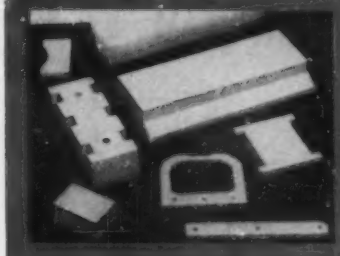
BALL & JEWELL, INC.

22 Franklin Street, Brooklyn 22, N. Y. • EVergreen 9-6580

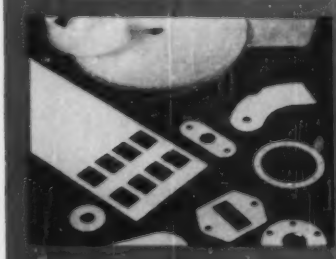
Exclusive Export Distributors: Omni Products Corp., New York, N. Y.



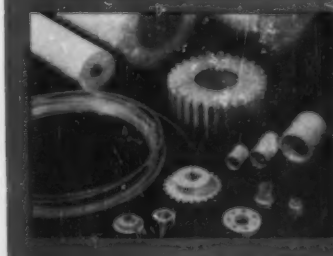
Cadco NYLON ROD: Ideal for applications stressing reduced wear in moving parts. Diameters, $\frac{1}{16}$" to 15"—Lengths to 10 feet.



Cadco NYLON SLAB: For applications requiring abrasion resistance, low friction and high shock resistance, mechanical strength. Thicknesses, $\frac{1}{8}$" to 2"—Widths to 12"—Lengths to 10 feet.



Cadco NYLON STRIP AND SHEET: May be economically stamped, blanked deep drawn, vacuum formed, or welded. Thicknesses, .010 to $\frac{1}{4}$"—Widths, $\frac{1}{4}$" to 6"—Lengths; Coils up to 24" OD, 15" ID (equals 2300 feet at .010" thickness, 740 feet at $\frac{1}{8}$" thickness).



Cadco NYLON TUBING: Recommended as tubing or pipe, and as stock for fabrication. Thin-wall tubing, Nominal OD, $\frac{1}{8}$" to $\frac{3}{4}$"—Nominal ID, .034" to .225". Length; Coils of 30" outside diameter (equals 1250 feet at $\frac{1}{8}$" OD, 100 feet at $\frac{3}{4}$" OD). Other tubing in lengths to 10 feet.

GREAT NEWS from CADILLAC!

We now manufacture

"cadco" NYLON

RODS • PLATE • TUBING STRIP and SHEET

Complete Stocks—Widest Range of Sizes

New Cadco Nylon is now manufactured in our ultra-modern plant under rigid controls to provide strength, stiffness, toughness, heat resistance, surface hardness and low frictional characteristics. Cadco Nylon is the *preferred* material for all standard applications—from heavy industrial gears to delicate instrument bearings—to consumer items requiring high gloss and purity of color.

- COMPLETELY STRESS-RELIEVED
- SONIC-TESTED TO ASSURE VOID-FREE QUALITY
- COMPLETE RANGE OF FORMULATIONS AVAILABLE

Send Today For New "Cadco" Nylon Brochure and Catalog

cadillac

PLASTIC AND CHEMICAL COMPANY

HEADQUARTERS FOR NEW IDEAS

15111 Second Blvd. — Detroit 3, Michigan

15 WAREHOUSES COAST TO COAST

WRITE NEAREST ADDRESS OR REQUEST NAME OF DISTRIBUTOR IN YOUR CITY

AKRON 8, OHIO, 39 S. Main Street
INDIANAPOLIS, INDIANA, 54 W. 30th
MINNEAPOLIS, MINNESOTA, 210 S. 5th Street
CHICAGO 6, ILLINOIS, 727 W. Lake Street
ST. LOUIS 3, MISSOURI, 2111 Olive Street
CLEVELAND 13, OHIO, 3333 Detroit Avenue
HOUSTON, TEXAS, 6426 Long Drive
KANSAS CITY, MISSOURI, 1517 Grand Avenue
CINCINNATI 10, OHIO, 1200 Walnut Street
DALLAS 7, TEXAS, 2546 Irving Blvd.
MILWAUKEE 2, WISCONSIN, 517 N. Broadway St.
SOUTH SAN FRANCISCO, CALIF., 313 Corey Way
LOS ANGELES 57, CALIF., 2305 W. Beverly Blvd.
FORT WORTH 1, TEXAS, 1400 Henderson

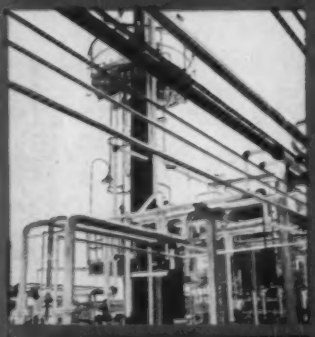
AMCEL

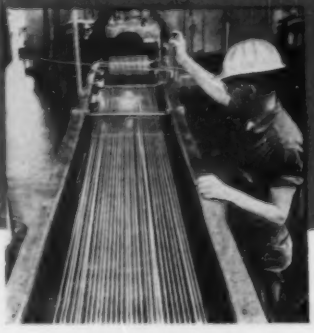
LOOK TO THIS WORLDWIDE TRADEMARK FOR PLASTICS

Amcel Plastics inspire tomorrow's products: *Fortiflex* high density polyethylene for toys, housewares, containers, industrial parts. *Cellulose Acetate* for appliances, personal articles, toys. *Forticel* cellulose propionate for telephones, ball point pens, transistor cases. Polyester resins for structural panels, boats, large moldings. *Acetate sheet* for vacuum forming and packaging. *Acetate film* for packaging and recording tapes.

Amcel representatives throughout the world are ready to serve you . . . with high-quality plastic materials produced to rigid specifications . . . with technical assistance to help you overcome your application problems . . . with prompt deliveries.

Amcel, Arnel, Fortiflex, Forticel, Type F and Type K are trademarks.





Amcel at your service in:

Amcel Co., Inc.

Australia	Hong Kong	Philippines
Austria	India	Poland
Belgian Congo	Israel	Portugal
Belgium	Italy	Rhodesia
Burma	Japan	South Africa
Denmark	Korea	Spain
Egypt	Lebanon	Sweden
England	Mexico	Switzerland
Finland	Morocco	Syria
France	New Zealand	Taiwan
Greece	Norway	Turkey
Holland	Pakistan	West Germany

Pan Amcel Co., Inc.

Argentina	Cuba	Nicaragua
Bolivia	Dominican Republic	Panama
Brazil	Ecuador	Paraguay
British Guiana	El Salvador	Peru
Canada	Guatemala	Puerto Rico
Chile	Haiti	Uruguay
Colombia	Honduras	Venezuela
Costa Rica		

PLASTICS
Cast Acetate Film and Sheet
Extruded Acetate Film and Sheet
Cellulose Acetate Molding Compounds
Cellulose Propionate Molding Compounds
Polyvinyl Acetate Emulsions
Low Pressure Polyethylene Molding Materials
Polyester Resins

CHEMICALS
Acids
Aldehydes
Lactones
Polyols
Vinyl Monomers
Acrylates
Alcohols
Esters
Glycols
Ketones
Plasticizers
Functional Fluids

FIBERS
Acetate (filament, staple, spun)
Arnel Triacetate (filament, staple, spun)
Solution Dyed Acetate
Type F Acetate Staple
Acetate Carpet Fiber
Type K Acetate Staple
High Tenacity Rayon
Rayon
Cellulose Acetate

AMCEL CO., INC. AND PAN AMCEL CO., INC.
180 Madison Avenue, New York 16, N. Y. • Affiliates of Celanese Corporation of America

topic for conversation...

GENERAL TELEPHONE SELECTS FORTICEL

How do you improve a masterpiece of function like the telephone? One way is to add color, and thus turn it into a thing of beauty as well. ■ That's what General Telephone has done for the benefit of its millions of subscribers—selecting Celanese Forticel to create the transformation. ■ Color is but one of the advantages that Forticel brings to precision products such as the telephone. This superbly-surfaced plastic is also tough and form retentive. It molds beautifully and fast, and it is free of objectionable odor. Manufacturers and product designers who have used Forticel have discovered its many superior characteristics. ■ Celanese Plastics Company, a Division of Celanese Corporation of America, Dept. 101-B, 744 Broad Street, Newark 2, New Jersey.

Canadian Affiliate: Canadian Chemical Company Limited, Montreal, Toronto, Vancouver
Export Sales: Amcel Co., Inc., and Pan Amcel Co., Inc., 180 Madison Avenue, New York 16.

Forticel...a Celanese plastic

Celanese® Forticel®

THIS IS DU PONT DELRIN®

a new engineering material offering the user distinct performance and cost advantages in many products once reserved for metals

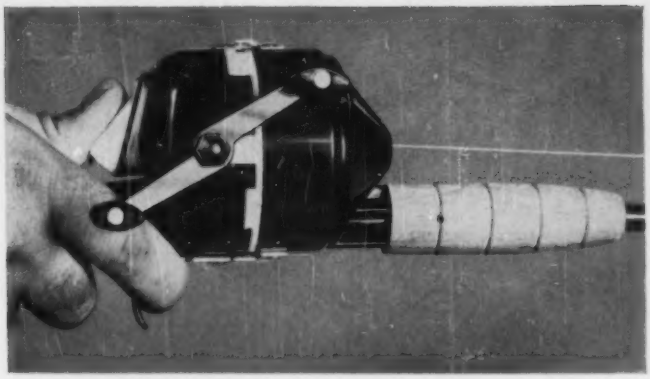
In "Delrin" acetal resin, manufacturers now have available an engineering material that offers the user distinct performance and cost advantages in many products now made of die-cast zinc and aluminum, cast and machined brass, stainless steel and cast iron.

The unique combination of physical properties and production economies offered by "Delrin" has already led to its specification for over 100 products. Three are described on the opposite page.

"Delrin" has the strength and stiffness to remain rigid in large sections; the tensile and flexural strength to withstand high-stress loadings; the dimensional stability to hold close tolerances; the resilience and abrasion resistance to operate usually without lubrication; and the chemical resistance to withstand corrosion. "Delrin" retains these desirable properties, too, even under exposure to wide temperature extremes, high humidity, corrosive solvents and stress.

Products can be economically mass-produced in "Delrin" via injection and extrusion molding . . . frequently in one-piece, integral shapes requiring no finishing operations. Parts may be joined by mechanical fasteners, spin welding or snap fittings. Production molds assure uniformity in part to part. Products can be surface-textured, painted, vacuum-metalized or made in integral colors.

We will welcome the opportunity to assist you in evaluating how "Delrin" can help you improve a product, lower its costs or develop new designs for your profit.



The Zebco Company of Tulsa, Okla., cites "Delrin" as making possible a truly corrosion-proof salt-water spinning reel. In their "Fabulous Zebco 88", "Delrin" is used for the housing, thumb control and body. Zebco found in "Delrin" the stiffness, toughness, light weight, wear and corrosion resistance it needed. The "Fabulous Zebco 99" is also made of "Delrin" for long-lasting fresh-water *spin fishing. (Molded by Continental Plastics Co., Oklahoma City, and Ajax Plastics, Tulsa, Okla.)*

THIS IS WHAT DELRIN® IS DOING

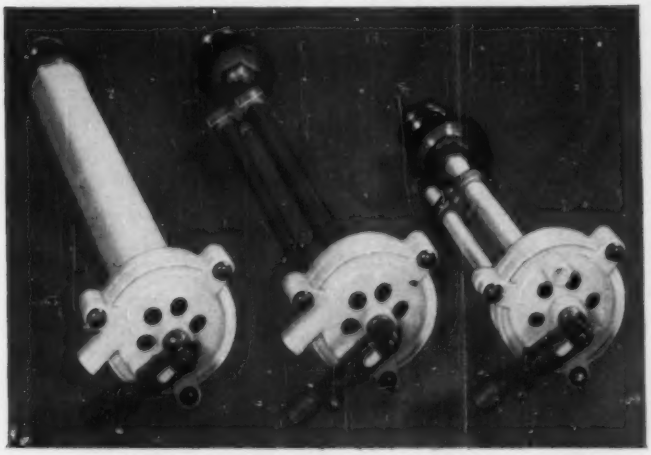
During the past three years, over 500 applications of "Delrin" have been field-tested by some 250 manufacturing concerns. This development program measured the ability of "Delrin" to perform in actual service vs. counterparts made of metals, rubber, wood and glass. In each case, detailed cost studies were also made to measure the cost advantage of using "Delrin".

As a result, and with the recently announced commercial availability of "Delrin", over 100 applications are being put into commercial production: gears, bearings, housings, aerosol bottles, faucet parts, valves, sporting equipment, telephone components, households items and many others.

We suggest that you investigate how "Delrin" can be profitably used in the products you make and the products you use. Commercial processors and our own staff of technologists are ready to assist you.

A new chain conveyor made by Union Chain & Manufacturing Co., Sandusky, O., features top plates molded of "Delrin". In switching from steel, the company states that "Delrin" offers constant dimensional stability, lower manufacturing costs and improved performance, because the smooth surface quality of "Delrin" means less spillage and breakage. (Molded by Anderson Associates, Toledo, Ohio.)

For their "Flow King" ball-cock valve (left in photo below), Coast Foundry & Manufacturing Co., La Verne, Calif., chose "Delrin" rather than brass for the valve's bonnets, because "Delrin" reduces production costs, and it has the required dimensional stability, stiffness and durability. These properties and savings (injection-molded "Delrin" eliminated all finishing operations) have prompted the use of "Delrin" for bonnets in two other valves. (Molded by Coast Craft Industries, Glendale, Calif.)



POLYCHEMICALS DEPARTMENT

DU PONT

REG. U. S. PAT. OFF.

Better Things for Better Living . . . *through Chemistry*

FOR MORE SPECIFIC INFORMATION MAIL THIS COUPON

E. I. du Pont de Nemours & Co. (Inc.)
Department AA-2, Rm. 2507D
Nemours Building, Wilmington 98, Delaware

I am interested in evaluating "Delrin" for the following use:

_____

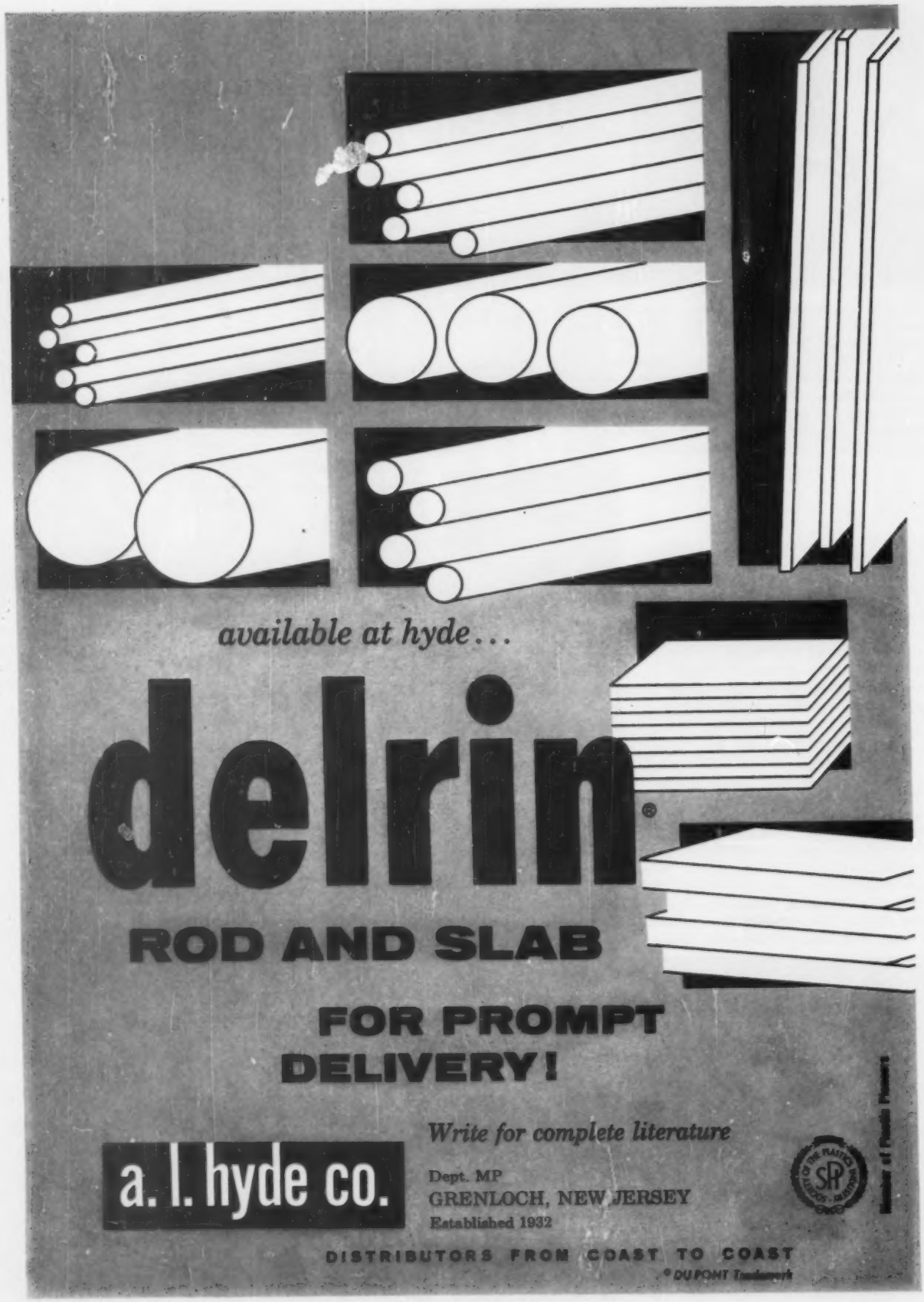
NAME_____

COMPANY_____ POSITION_____

STREET_____

CITY_____ STATE_____

In Canada: Du Pont of Canada Ltd., P.O. Box 660, Montreal, Que.


available at hyde...
delrin®
ROD AND SLAB
FOR PROMPT DELIVERY!
Write for complete literature
a. l. hyde co.
Dept. MP
GRENLOCH, NEW JERSEY
Established 1932
DISTRIBUTORS FROM COAST TO COAST
® DU PONT Trademark

BRIGHTER OUTLOOK FOR BULK PACKAGING

...MARLEX* Tailored Resin-101 for tougher, lighter, more economical bags

Chippewa and other leading manufacturers of heavy-duty bags are now making blown-tubing linear polyethylene bags from new MARLEX TR-101 resin. Stronger, tougher, more moisture resistant, and less expensive than low-density polyethylene bags for the same use . . . these new TR-101 bags offer attractive, more efficient, and less costly plastic packaging for bulk materials.

Laboratory and field tests prove that thinner-walled TR-101 bags outperform thicker-walled regular polyethylene bags. For example, TR-101 bags have up to 40% more tensile strength and more than 2½ times the impact strength. And, because TR-101 bags have thinner walls, they cost less to buy, less to use, less to ship.

For bulk material packagers currently using Kraft paper or low-density polyethylene bags, metal or fiber drums, and similar materials . . . new heavy-duty bags made with MARLEX TR-101 mean less freight costs . . . excellent protection against product loss from handling or moisture spoilage . . . attractive packaging with colored or translucent film . . . and reduced packaging costs.

More and more packaging suppliers are finding the inherent physical properties of MARLEX TR-101 film for bags—strength . . . ability to withstand the severest climatic conditions . . . resistance to corrosion, rot and bacteria—also make it ideal for such non-bag applications as industrial tarps, agricultural films for mulches and other farm uses, covers for large machinery, and vapor barriers for construction.

For full details on MARLEX Tailored Resin-101 contact the nearest office listed below.

*MARLEX is a trademark for Phillips family of olefin polymers

PHILLIPS CHEMICAL COMPANY, Bartlesville, Oklahoma, a subsidiary of Phillips Petroleum Company

PLASTICS DIVISION OFFICES

NEW ENGLAND	NEW YORK	AKRON	CHICAGO	WESTERN	SOUTHERN
322 Waterman Avenue	80 Broadway, Suite 4300	318 Water Street	111 S. York Street	317 N. Lake Ave.	6010 Sherry Lane
East Providence 14, R. I.	New York 5, N. Y.	Akron 8, Ohio	Elmhurst, Ill.	Pasadena, Calif.	Dallas 25, Texas
GEneva 4-7600	Digby 4-3480	FRanklin 6-4126	TErrace 4-6600	MUrray 1-6997	EMerson 8-1358

EXPORT: PHILLIPS PETROLEUM INTERNATIONAL CORPORATION • P. O. Box 7239, Panama City, Panama • Sumatrastrasse 27, Zurich 6, Switzerland

PHILLIPS 66 MARLEX

ERIE-nomics at work...

One-piece plastic part combines frame and name...saves Westinghouse 12½%

This identification panel made by Erie Plastics for the Westinghouse "Space-Mate Laundromat" is a big part . . . 77 square inches of surface. And an interesting part combining a 3-D metallized frame and a vacuum-deposited 3-D gold name plate. Its assembly to the machine is done by simply pushing-on fasteners over integral-molded studs.

And savings! Westinghouse estimates over 12% direct reduction in cost, compared to a conventional multi-piece assembly. Plus elimination of all the problems of complicated multi-piece-assembly inventories, designs, and damaged or out-of-stock parts.

ERIE-nomical Plastic Parts offer your designers many possibilities . . . top or rear-surface metallizing that is impervious to weather and laundry detergents . . . colorful 3-D decorations that harmonize with automobile and other color schemes . . . large industrial parts up to 120 ounces.

Write today for a booklet about the services of Erie Plastics. Tell us when you would like to see the man from ERIE.

ERIE PLASTICS

ANDOVER INDUSTRIES, INC.
Andover, Ohio

FRYLING ELECTRIC PRODUCTS CO.
Holly Springs, Miss.

SUBSIDIARIES OF ERIE RESISTOR CORPORATION · ERIE, PA

CAPITOL STEREO THE FULL SPECTRUM OF SOUND
ORIGINAL BROADWAY CAST
THE MUSIC MAN
A new Musical Comedy
ROBERT PRESTON
MEREDITH WILLSON
with BARBARA COOK · DAVID BURNS · PERT KELTON
THE BUFFALO BILLS
ENTIRE PRODUCTION STAGED BY MORTON DA COSTA

Photograph taken through the courtesy of Capitol Records, Inc., Hollywood, California

Answer to a pressing problem – PLIOVIC!

On a stereophonic record, the stylus moves both laterally and vertically in the grooves. This compares with regular hi-fi records where the movement is only from side to side.

The problem of pressing grooves tough enough to do twice the work was solved by one leading record-maker with Pliovic.

PLIOVIC not only toughens the grooves, but also improves the "flow," reduces flash, lowers rejects and – most important – does all this without impairing tone.

How can PLIOVIC help your product? Full details, including the latest *Tech Book Bulletins,* are yours by writing Goodyear, Chemical Division, Dept. N-9422, Akron 16, Ohio.

GOODYEAR

CHEMICAL DIVISION

Pliovic – T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

DRESS UP WITH HURLBUT SATURATING PAPERS

HURLBUT PAPERS *will give your product eye-appeal.*
HURLBUT PAPERS *will upgrade those drab surfaces.*
HURLBUT PAPERS *will accept most any resin system.*
HURLBUT PAPERS *will print easily and cleanly.*

write us about your specific requirements

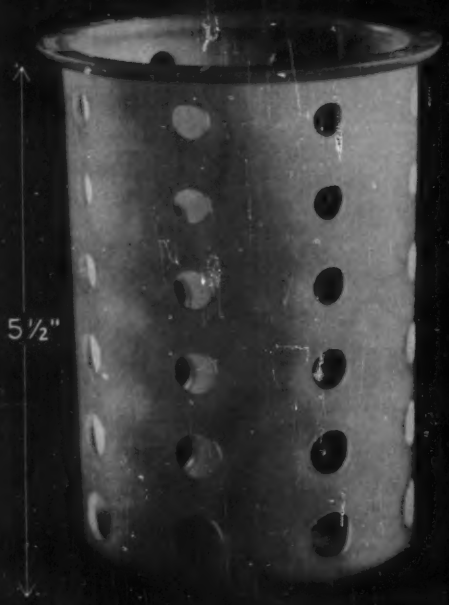
Somewhere among the **HURLBUT** *line of Alpha-Rag-Glass, Silicate and Asbestos Fiber — Overlay and Print Base Papers, you will find the answer to your white, colored self-decorated and printed laminating problems.*

HURLBUT PAPER COMPANY
SOUTH LEE, MASSACHUSETTS
A SUBSIDIARY OF THE MEAD CORPORATION

CAN YOU USE EXTRA MOLDING CAPACITY

LIKE THIS?

5½ OZ. NYLON CONTAINER. New Products Company, Indianapolis, uses a REED 175T to mold this difficult nylon silverware washing and dispensing cup for Steril-O-Matic, Inc.



6.44 OZ. BUTYRATE TOY BUS TOP. This is an exceptional job molded for Fisher-Price by Trimold, Inc., of Kenmore, N.Y. on the REED 175T—4/6 oz. injection molding machine.

Built-in Extra Capacity on the 175T–4/6 oz. REED Means Profitable, High-speed, Automatic Operation.

The molded items shown are typical of the kind of performance molders have come to expect from the REED 175T. This popular and versatile REED, most widely used 4 oz. injection molding machine available today, gives you the built-in capacity that helps you run bigger, more difficult molds with ease. Check some of the features that have helped Trimold, Inc. and New Products Company become top molders in the field.

• Built-in stuffing arrangement permits shots of 6 oz. or more through multiple strokes • Jumbo heating cylinder with twice the capacity of the standard cylinders • New high-torque, 15 H.P. motor as standard equipment. Cuts dry cycle time to 5.7 seconds.

If you want faster molding and greater built-in capacity, see your Reed-Prentice Sales Engineer. He will show you how the REED 175T—4/6 oz. machine will help you increase your profits through greater productivity.

SPECIFICATIONS	175T—4/6
Mold clamping stroke	8"
Platen size (W X H)	22 x 24½"
Diameter of tie bars	3"
Space between tie bars	13½ x 13½"
Rated casting area, square inches	75
Plasticizing capacity, pounds per hour	75
Dry cycle time, seconds	5.7

REED-PRENTICE

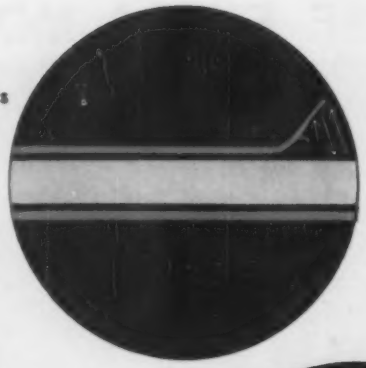
division of

PACKAGE MACHINERY COMPANY

EAST LONGMEADOW, MASSACHUSETTS

BRANCH OFFICES: BUFFALO • CHICAGO • CLEVELAND • DEARBORN • KANSAS CITY • LOS ANGELES • NEW YORK

Solving unusual problems with Riegel papers



...use Riegelease* paper

Releasing papers for pressure-sensitive adhesives must safeguard the adhesive tack . . . and must peel easily when needed without picking.

But every adhesive is different. Even the same adhesive varies, depending on the base material to which it's applied, as well as the processes and the type of coater used by the converter. It takes careful testing to find the exact release paper that will be most satisfactory.

The same is true in separating papers for plastic laminates, film casting papers, foam casting papers, container liners, and interleaving papers for rubber in process, caulking compounds and other tacky materials.

For over 15 years, users of pressure sensitive adhesives have been coming to Riegel to assist them in solving release paper problems. Riegel's pioneering laboratory and production experience is the most important reason why it pays you to call Riegel first.

Riegelease is available in numerous weights with a variety of coatings for adhesives and tacky substances. Coated one or two sides, on colored papers, and printed if desired.

Send today for FREE Riegelease Selector Manual

OVER 600 RIEGEL PAPERS

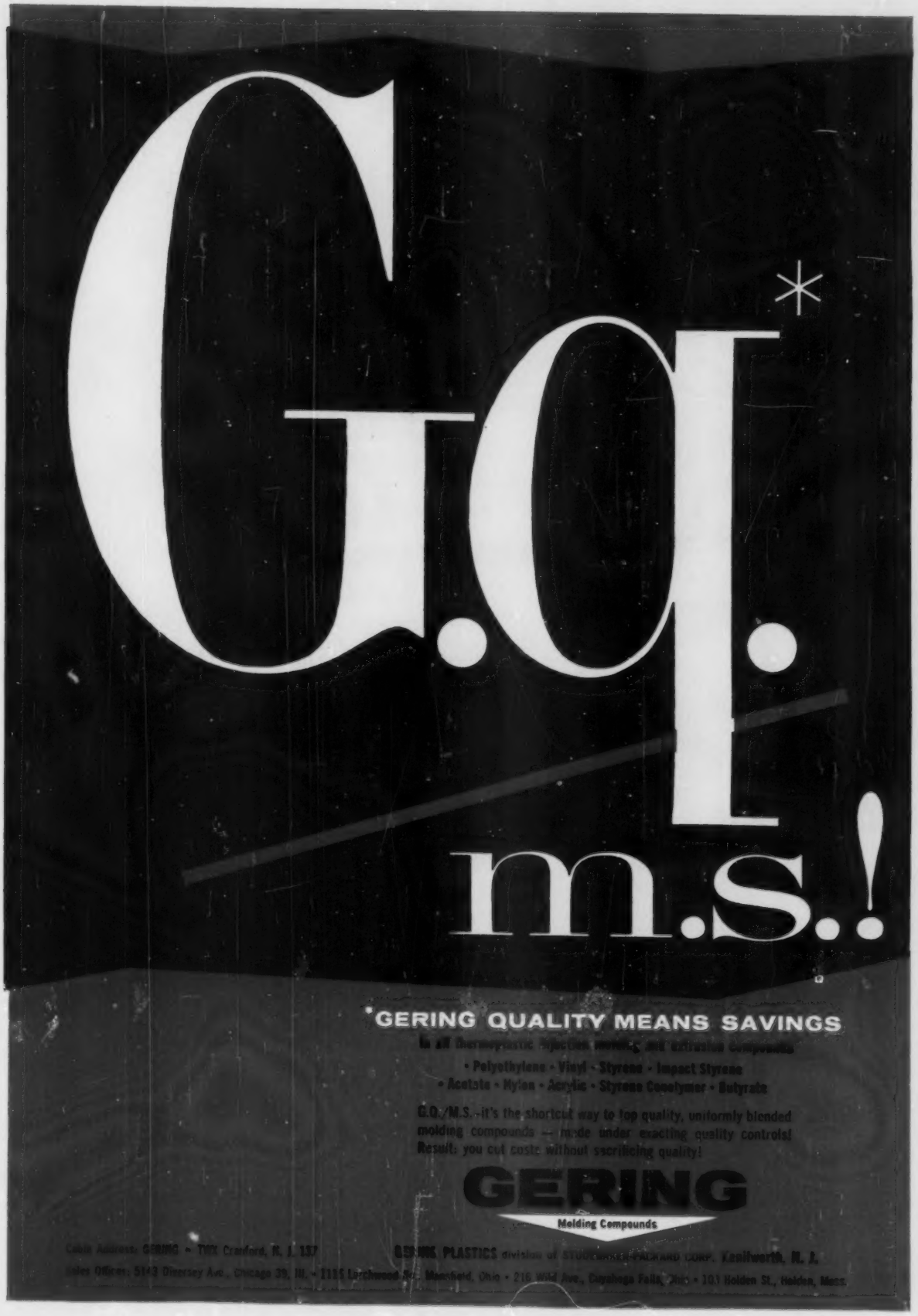
- Release papers for pressure sensitive adhesives
- Casting papers for films, adhesives and polyurethane foam
- Separating papers for plastic laminating
- Interleaving papers for tacky materials
- Resin-impregnated papers
- Heat-seal coated papers
- Laminations of paper, film or foil
- Polyethylene extrusions on paper, film or board

Riegel .....write to:

Technical Advisory Service
Riegel Paper Corporation
Box 250, New York 16, N. Y.

*TM

TECHNICAL PAPERS FOR INDUSTRY


G.Q.*
m.s.!
*GERING QUALITY MEANS SAVINGS
• Polyethylene • Vinyl • Styrene • Impact Styrene
• Acetate • Nylon • Acrylic • Styrene Copolymer • Butyrate
G.Q./M.S.–it's the shortcut way to top quality, uniformly blended molding compounds — made under exacting quality controls! Result: you cut costs without sacrificing quality!
GERING
Molding Compounds

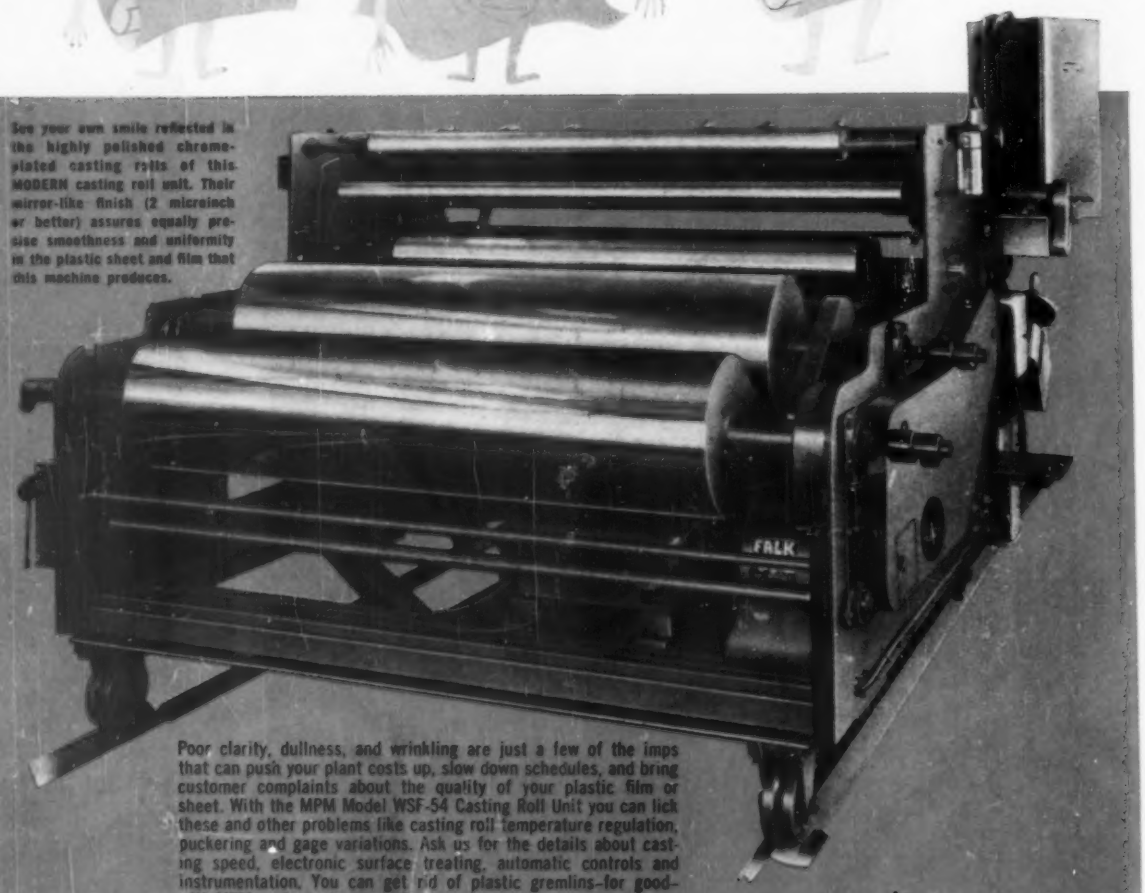
Are these plastic gremlins eating into your profits?

DOTTY DULLNESS

WRINKLE WILLY

OLGA OPAQUE

See your own smile reflected in the highly polished chrome-plated casting rolls of this MODERN casting roll unit. Their mirror-like finish (2 microinch or better) assures equally precise smoothness and uniformity in the plastic sheet and film that this machine produces.



Poor clarity, dullness, and wrinkling are just a few of the imps that can push your plant costs up, slow down schedules, and bring customer complaints about the quality of your plastic film or sheet. With the MPM Model WSF-54 Casting Roll Unit you can lick these and other problems like casting roll temperature regulation, puckering and gage variations. Ask us for the details about casting speed, electronic surface treating, automatic controls and instrumentation. You can get rid of plastic gremlins–for good–with MPM equipment.

MODERN CASTING ROLL UNIT

59-3

MODERN PLASTIC MACHINERY CORP.

64 Lakeview Ave., Clifton, N.J. • Cable Address: MODPLASEX

when pennies count!...

use

MUEHLSTEIN

reprocessed polyethylene and polystyrene

PROMPT DELIVERY FROM WAREHOUSE INVENTORIES
QUALITY MATERIALS REPROCESSED WITH METICULOUS CARE
COMMERCIAL COLOR MATCHES
SHIPPED IN 50 POUND MULTI-WALL BAGS OR DRUMS

H. MUEHLSTEIN & CO.
60 EAST 42ND STREET, NEW YORK 17, N. Y.

CONVENTIONAL AND HIGH DENSITY POLYETHYLENE
REGULAR AND HI-IMPACT POLYSTYRENE

REGIONAL OFFICES: Akron . Chicago . Boston . Los Angeles . Toronto . London
PLANTS AND WAREHOUSES: Akron . Chicago . Boston . Los Angeles . Jersey City . Indianapolis

Public Service Coordinated Transport, owner and operator of 2511 buses in New Jersey, with established routes into the cities of New York, Philadelphia and Wilmington, carried 290,000,000 passengers over 90,000,000 miles in 1958 alone. Impressive as these statistics sound, they made little or no impression on the heavy duty coated fabric upholstery used by the company. So sturdy is this material that much of Public Service's original purchase, made in 1947, is still standing up under everyday use.

In making Koroseal, the supported vinyl upholstery material producing these amazing wear results, B. F. Goodrich looks to Wellington Sears for the strong fabric backing it requires . . . one of the many Wellington Sears fabrics engineered for specific jobs of all kinds.

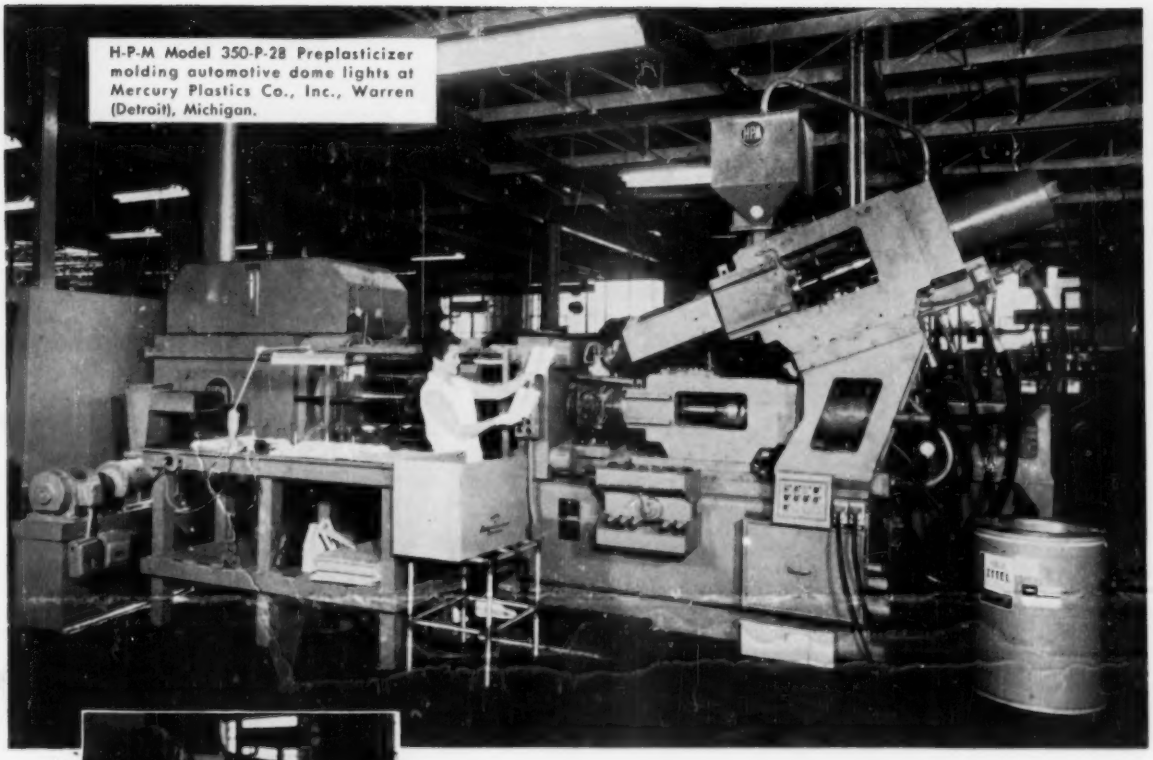
For cotton or synthetic industrial textiles, more and more companies are turning to Wellington Sears – and taking advantage of our more than a century of experience in providing fabrics to industry. For help in your own fabric applications, write for technical assistance and a free illustrated booklet, "Fabrics Plus," Dept. K-2.

WELLINGTON SEARS

FIRST In Fabrics For Industry

For Coated Materials, High and Low Pressure Laminates, and other Reinforced Plastics Products

Wellington Sears Company, 111 West 40th Street, New York 18, N.Y. • Akron • Atlanta • Boston • Chicago • Dallas • Detroit • Los Angeles • Philadelphia • San Francisco



H-P-M Model 350-P-28 Preplasticizer molding automotive dome lights at Mercury Plastics Co., Inc., Warren (Detroit), Michigan.

Shipments were increased 30% on this dome light when Mercury switched to an H-P-M P-28 preplasticizer.

Al Nick, Mercury Plastics, says,

"WE'VE INCREASED SHIPMENTS CONSIDERABLY ON NYLON PARTS

SINCE SWITCHING OUR AUTOMOTIVE DOME LIGHT MOLD FROM A CONVENTIONAL MACHINE TO OUR NEW H-P-M PREPLASTICIZER."

Other molders have enjoyed similar success with the new H-P-M 28 oz. machines molding such parts as nylon gears, valves, lacing strips and other parts. These new machines also have proven themselves for molding polyproplyene, acrylic and many other thermoplastic materials.

Two new 28 oz. H-P-M model preplasticizers are available. One has a clamping force of 200 tons, 25″/29″ *daylight, 15″ stroke and 15″ x 26″ mold space. The other has a clamping force of 350 tons, 34″/42″ *daylight, 22″ stroke and 20″ x 34″ mold space. Both machines are extremely fast and have plenty of plasticizing capacity for molding on minimum cycles. With accurate shot control, every part weighs the same.

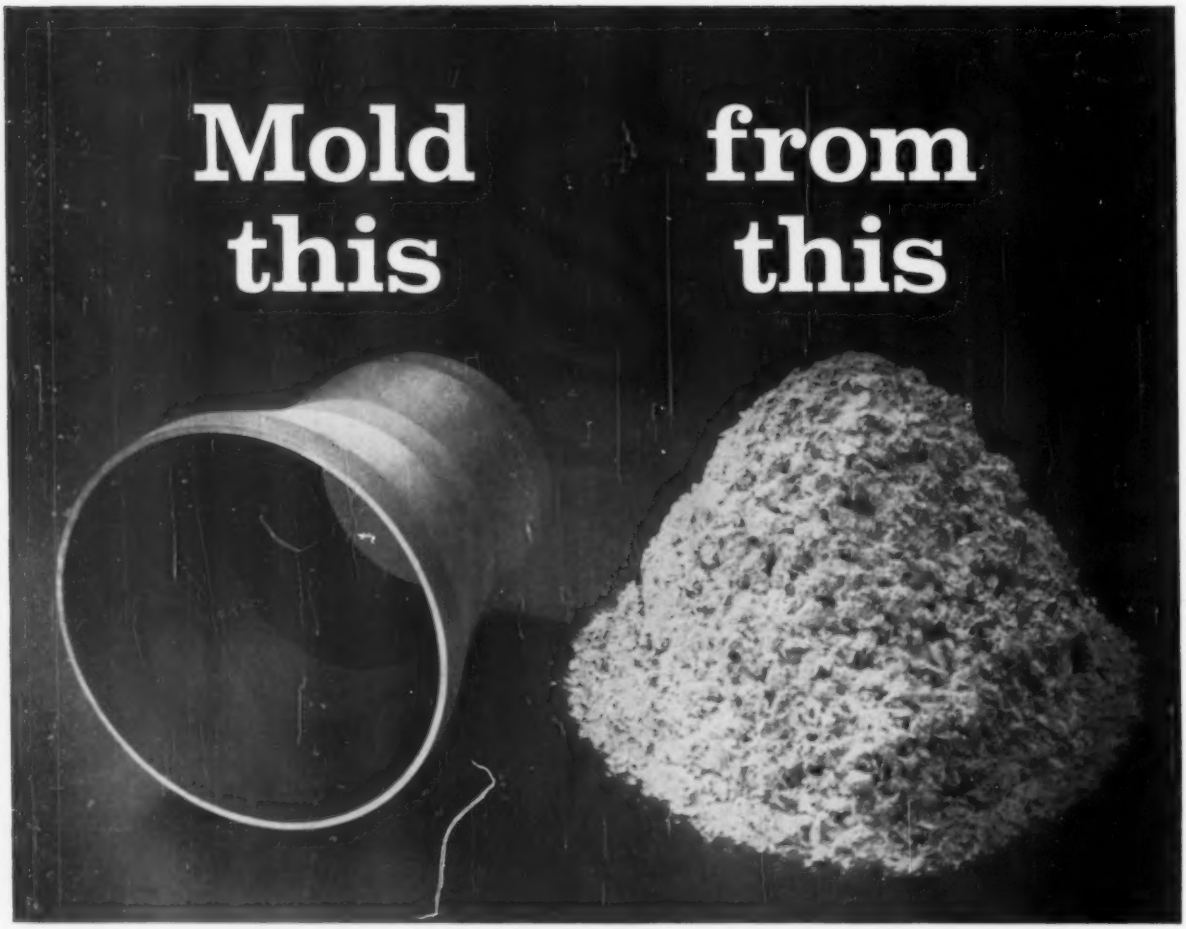
It will pay you to talk with an H-P-M field engineer about these new Model P-28s before you buy. Write or phone, today.

**Daylight with ejector box removed.*

THE HYDRAULIC PRESS MANUFACTURING COMPANY
A Division of Koehring Company • Mount Gilead, Ohio, U.S.A.

HPM

H3

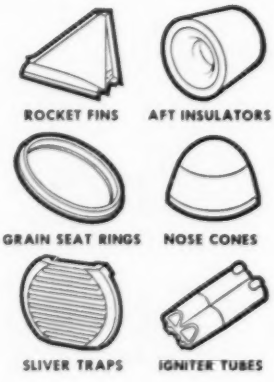


...for missile parts of high-temperature asbestos-phenolics— R/M style 150RPD molding compound

Virtually every U.S. missile carries plastic parts made of R/M raw materials. Starting point for many of these parts exposed to burning propellants and other high-temperature environments is R/M style 150RPD molding compound.

The extra-long spinning-grade asbestos fibers which form the basis of this R/M material provide a unique combination of properties: high-temperature insulation, low thermal diffusivity, excellent resistance to ablation and shock, high strength/weight ratio, and good electrical-insulating properties. No other molding compound offers all these advantages plus the handling ease inherent in R/M style 150RPD.

Investigate the extraordinary strengths of R/M style 150RPD molding compound for parts which must take heats as high as 10,000°F for short periods. Available for immediate shipment in production quantities. Write for information on molded billets for research purposes.

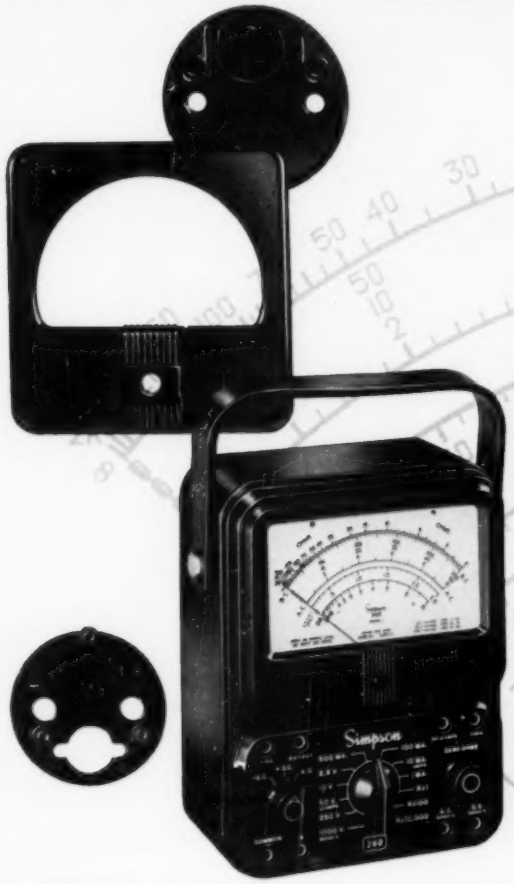


RAYBESTOS-MANHATTAN, INC.

Reinforced Plastics Department, Manheim, Pa.

SPECIALISTS IN ASBESTOS, RUBBER, ENGINEERED PLASTICS, SINTERED METAL

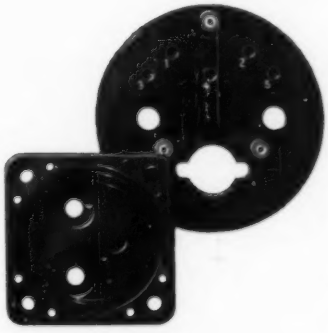
IF PHENOLICS CAN DO IT, **PLENCO** CAN PROVIDE IT—AND DOES—FOR **SIMPSON ELECTRIC**



for over 500 Simpson-molded parts

Simpson specified molding materials by

PLENCO



You don't have to baby the VOMs, VTVMs and other widely-used electrical measuring instruments made by Simpson Electric Company, Chicago. They're built for toughest service, accuracy and sensitivity. Housings, covers, knobs and handles, too, must be *right*—molded of materials that are dimensionally stable, high in electrical, impact and heat resistance, and with preformability characteristics that permit the close tolerances specified at any given check point. We regard it as a commendation that, in over 500 separate instances, Simpson engineers turned to Plenco for these approved phenolic molding materials.

Like Simpson, an ever-increasing number of manufacturers, designers and molders have learned to rely on Plenco phenolic compounds (ready made *or* specially made) to help solve today's challenging product and production problems. We'd like to show you how Plenco does it—and how Plenco can do it for *you*.

PLENCO PHENOLICS
FOR BETTER PLASTIC PRODUCTS

PLASTICS ENGINEERING COMPANY
Sheboygan, Wisconsin

Serving the plastics industry in the manufacture of high grade phenolic molding compounds, industrial resins and coating resins.

Take a long look at Jefferson's new polyethers and foam catalysts for the urethane industry

Jefferson Chemical has in commercial production a line of high quality polyethers which you are urged to evaluate in your particular urethane processes. Currently available are reactive intermediates in the molecular weight range of 400 to 3000. In addition, diethylene glycol is available for use in polyester-based flexible foams.

All are made to rigid urethane specifications with emphasis on low unsaturation, low water content, low ash, low acid numbers, and controlled pH. With one or a combination of these Jefferson polyethers in your formulations, desirable resilience, compression set, and compression deflection characteristics can be obtained.

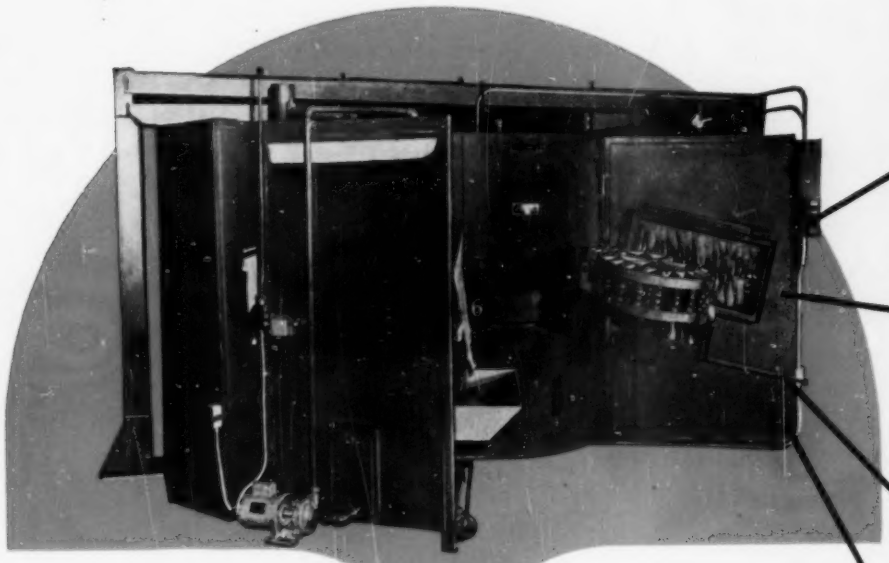
Jefferson is also your best source for commercial quantities of N-methylmorpholine and N-ethylmorpholine which are excellent catalysts for the preparation of flexible, semi-rigid and rigid urethane foams.

Still another interesting amine catalyst is N,N′-dimethylpiperazine. It is proving useful as a foam catalyst and is available in developmental quantities.

Make Jefferson your partner in developing better urethane products. For complete technical information and samples of these new reactive intermediates and catalysts . . . contact Jefferson Chemical Company, Inc., 1121 Walker Avenue, P. O. Box 303, Houston 1, Texas.

Ethylene and Propylene Oxides, Glycols, Dichlorides, Carbonates • Ethanolamines
SURFONIC® Surface-Active Agents • Polyethylene and Polypropylene Glycols • Morpholine
N-Alkyl Morpholines • Piperazine • Piperazine Salts • Nonyl Phenol • Caustic Soda
HOUSTON • NEW YORK • CHICAGO • CLEVELAND • CHARLOTTE • LOS ANGELES

JEFFERSON CHEMICALS



MOLDING MAGIC!

MOLD UP TO 1620 BIG PROFIT ITEMS PER HOUR . . . LIKE MAGIC

PRESTO . . . PRODUCTION and PROFITS!

Yes, it seems like magic the way this machine converts raw material into finished goods, in one continuous operation. With only one man at the controls, polyvinyl chloride plastisols, vinyl foams, polystyrene expandable beads, miccron and polyethylene blends are automatically dispensed and rotationally molded to shape, completely controlled by the automatic features of the machine. The operator need not be a technician, because all the raw materials are scientifically prepared, using all the technological advances made by the nation's foremost companies. Now, any hollow article can be molded from these raw materials, thus creating countless new product possibilities. With a high hourly production and a low hourly cost, it naturally follows that units produced on this machine are BIG PROFIT items.

LET US SHOW YOU HOW TO DO IT!

We want to demonstrate our "magic" to you. Visit our plant and let us mold YOUR PRODUCTS, right before YOUR EYES . . . like "magic".

Write or call for detailed data or an appointment.

NOW . . . even BIGGER!

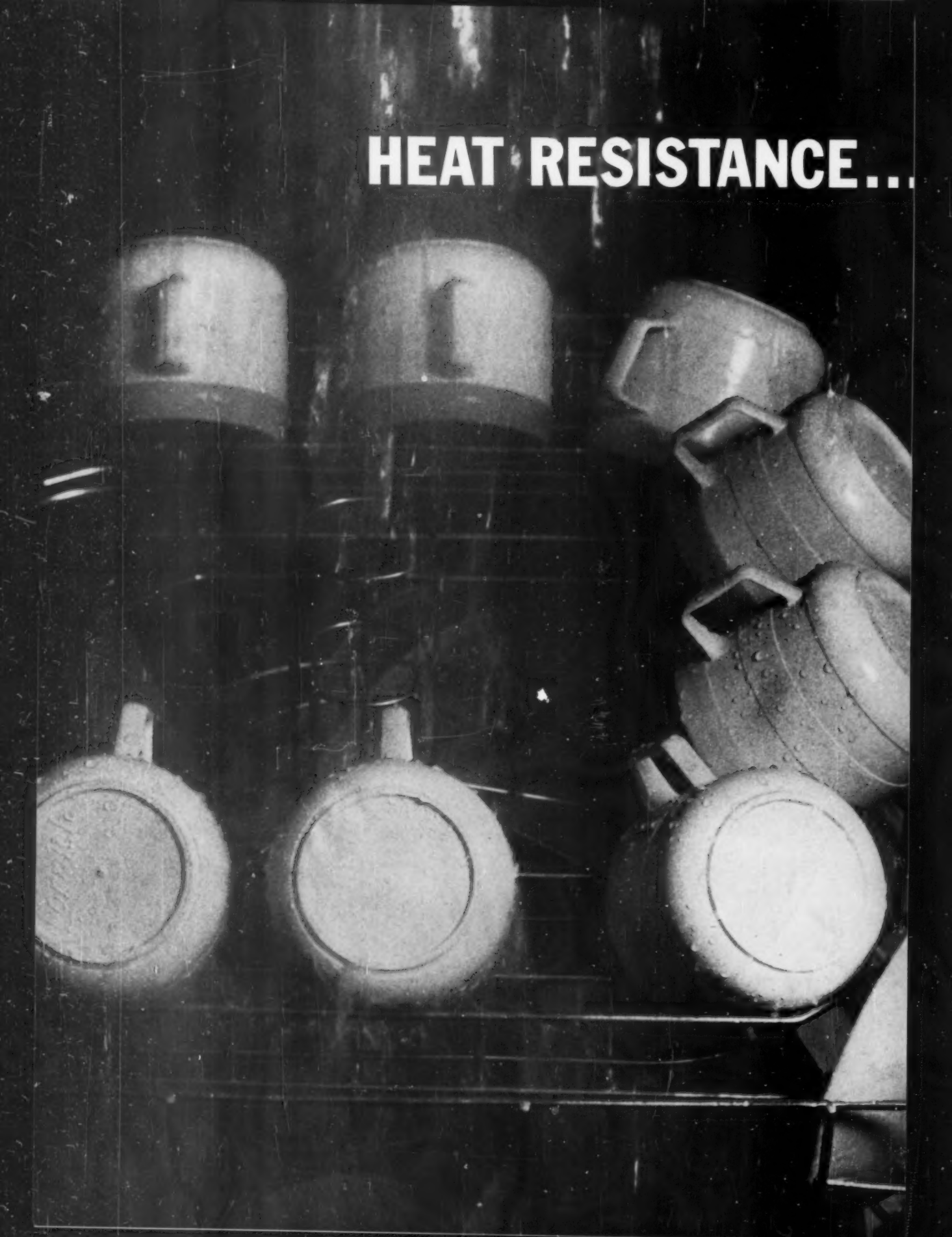
Machines are available with a 15", 25" and 75" molding area, capable of molding items eight times larger than previously thought possible, such as the unicorn, shown here. Imagine, it's automatically molded in one operation!

THE AKRON PRESFORM MOLD CO.

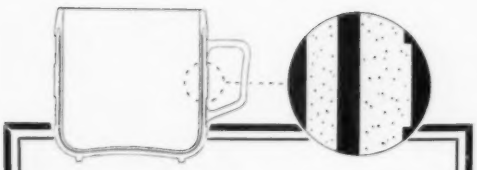
Phone WA 8-2105

2044 Main Street, Cuyahoga Falls, Ohio

FORMS	MOLDS	DIES	MACHINERY
LATEX DIPPING	STEEL AND ALUMINUM	PLASTIC INJECTION	SPECIAL AUTOMATIC


HEAT RESISTANCE...

...another way high-density polyethylene IMPROVES YOUR PRODUCT



Cutaway showing construction of Cornish Therm-O-Coffee cup. Insulation space permits comfortable handling regardless of temperature of the contents. Molded by Bopp-Decker Plastics Company, Clawson, Mich. for Proven Products Corp., Skokie, Ill.

TYPICAL PROPERTIES OF DMD-6201

	ASTM Test	
Density, gm/cc	D 792-50(A)	.950
Melt Index, gm/10 min.	D 1238-57T	8.0
No-Load Heat Distortion Temperature		128°C (262°F)
Secant Modulus (Stiffness), psi	D 638-58T	100,000
Tensile Strength, psi	D 638-58T	3300
Ultimate Elongation, %	D 638-58T	45
Tensile Impact (ft. lbs./cu. in.)		50

All physical tests conducted on samples with no orientation.

SCALDING DISHWASHER TEMPERATURES are no problem for BAKELITE Brand high-density polyethylenes. The material used in these cups—injection molded DMD-6201—stands up to dishwasher treatment day in and day out without losing shape or appearance. In actual tests, BAKELITE Brand high-density polyethylenes withstood both boiling water and steam sterilization.

Heat resistance is just one advantage of BAKELITE Brand high-density polyethylenes. You can select from formulations that emphasize strength, rigidity, surface appearance, stress cracking resistance, dimensional stability, and moldability in varying combinations.

In fact, you can select from a complete range of polyethylenes at Union Carbide Plastics Company... Extending through low, medium, and high densities, the choice also includes the remarkable new polyethylene copolymers. These copolymers possess the outstanding advantages of low temperature toughness, stress cracking resistance and unparalleled flex life. The same knowledge and experience that developed these materials is available to help you in using them to improve your product. Mail the coupon today, or write a description of your requirements directly to Dept. BC-60G, Union Carbide Plastics Company, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y. *In Canada*, Union Carbide Canada Limited, Toronto 7.

BAKELITE and UNION CARBIDE are registered trade-marks of Union Carbide Corporation.

UNION CARBIDE

Even boiling water and steam sterilization failed to damage these cups made of BAKELITE Brand high-density polyethylene.

Dept. BC-60G
Union Carbide Plastics Company
Division of Union Carbide Corporation
30 East 42nd Street, New York 17, N. Y.

Please send me information on BAKELITE Brand high-density polyethylenes with particular emphasis on these properties.....

the application being considered is .....

Name _____

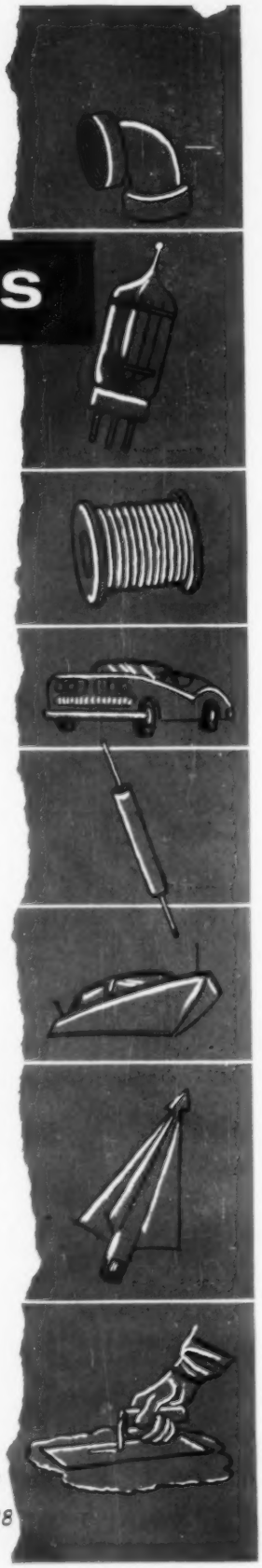
Firm name _____

Street _____

City _____ State _____

CLINCO

EPOXY COMPOUNDS



The Most Complete Quality Line...

from a long established, reliable, centrally located Chicago manufacturer

CLINTON offers a full series of special epoxy formulations developed to meet the growing list of applications for this versatile material in almost every field of manufacturing—from rockets to radio parts. All are available in bulk quantities . . . a few of the more popular compounds are listed below:

2-C-202 High Heat Distortion, Hard, Abrasion Resistant Casting Compound.

Suggested Uses: 1—Dies. 2—Jigs. 3—Fixtures where high heat distortion, good hardness, and abrasion resistance are needed, and oven-curing facilities are needed. It can also be used for Casting Pipe Fittings.

2-C-204 Room Cure Casting Compound for Thick Sections.

Suggested Usage: A Room Cure Casting Compound for Jigs, Fixtures, Dies, Core Boxes, etc.

2-C-208 Casting and Sealant Compound.

Used for small Castings which require Electrical Conductivity. This formula has 5,000 to 18,000 ohms/inch resistance.

This material can be used as a solder for electrical connections.

2-C-214 Molding and Extrusion Compound.

Suggested Uses: Injection Molding Electrical Parts, Pipe, and many other types of Molding applications. This formula can also be extruded successfully.

2-C-215 Encapsulating Compound.

Suggested Use: For encapsulating any electrical component to give it electrical insulating resistance.

2-C-217 Protective Coating for Coil Wire.

Suggested Uses: For coating electrical wires and coils. May also be dip-coated.

2-C-218 Tube Sealing Compound.

Suggested Uses: To be used as a sealing compound for sealing ends of Capacitators and Tube Sockets. This formula is resilient and can be used where thermal expansion is a problem in Capacitators.

2-C-243 Potting Compound.

Suggested Uses: For potting of electrical components such as filter networks, audio stages, etc. This material is poured around the form to be potted.

2-C-227 White Sprayable Surface Coat.

Suggested Use: To be sprayed on the inside of a mold upon which a mold-release agent has been applied.

It is also used by brushing layer upon layer on fibre glass to build up a desired thickness, curing each coat as you go along.

This can be supplied in a variety of colors.

2-C-239 Tile Cement—Chemical Resistant Sealer for space between Tiles.

Suggested Uses: To fill space between tiles in order that the surface will have excellent chemical resistance.

2-Y-127 Concrete Floor Patching Compound.

Suggested Use: For repairing Concrete at heavy wear points.

2-C-409 Masonry Waterproofing Compound.

Suggested Use: Waterproofing material, such as on basement walls, on exterior masonry surfaces, both for decorative purposes (when supplied in pigmented form) as well as for waterproofing purposes. Cinder block wall construction may be used on a large scale with full protection provided by this liquid epoxy coating.

2-C-236 Boat Patching and Repair Laminating Compound.

Suggested Uses: As mentioned above, it can be used for repairing or covering wood or metal boats and automobile bodies.

2-C-195 General Purpose Adhesive.

Suggested Uses: Bonding metal to metal, wood to wood, plastic to plastic, etc.

2-C-199 Flexible Room-Cure Adhesive.

Suggested Uses: For bonding flexible surfaces to flexible surfaces.

CLINCO

Bring Us YOUR Epoxy Problems . . .

THE CLINTON COMPANY

Pioneering Quality Industrial Finishes Since 1928

1216 ELSTON AVE. • CHICAGO 22, ILL. • Phone: ARmitage 6-7760

Tri-State Molding Co., Henderson, Ky., molds high heat polystyrene tumblers on their NATCO 300

"No maintenance on Natco in a year"

. . . Says Larry Boehme, TRI-STATE Plastics Manager

"Maintenance has been next to nothing on our Natco with its shockless hydraulic system. What's more, we can get good deep draws, maintain shot weights within extremely close limits, and can quickly and easily change molds. Our operators like the Natco because they are simple to set-up and operate." This is the way molders like Larry Boehme talk about Natco injection molding machines.

And this satisfaction is typical among Natco owners —for the Natco 12 to 80 ounce machines have become the industry standard for dependability and ease of operation. The Natco high speed clamp action, fast injection rate, two speed injection control, automatic dual voltage heating, big leakproof heating chamber and many other outstanding features are more reasons why Natco is first choice of molders who are looking for more profit in today's competitive market. Write for Catalog 2001.

NATCO

THE MOLDER'S MOLDING MACHINE

NATIONAL AUTOMATIC TOOL COMPANY, INC.
PLASTICS MACHINERY DIVISION
RICHMOND, INDIANA, U. S. A.

VINYL STABILIZER 6V2*

YARDSTICK FOR INDUSTRY

Introduces NEW controls in an inexpensive liquid stabilizer in all formulations for calendering, extruding and molding

For the first time performance variations due to resin or plasticizer or filler are minimized . . .

For the first time storage problems due to exposure of stabilizer or compound to oxidation or moisture are eliminated . . . with STABILIZER 6-V-2

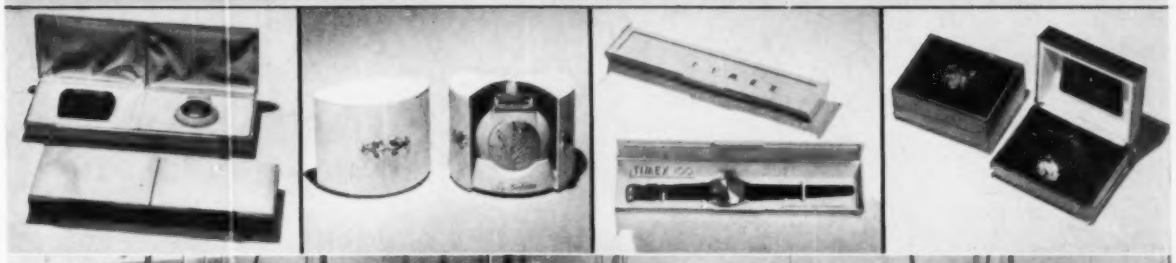
* Highest mileage in heat and light stabilization plus the new regulating effects are yours at no extra cost

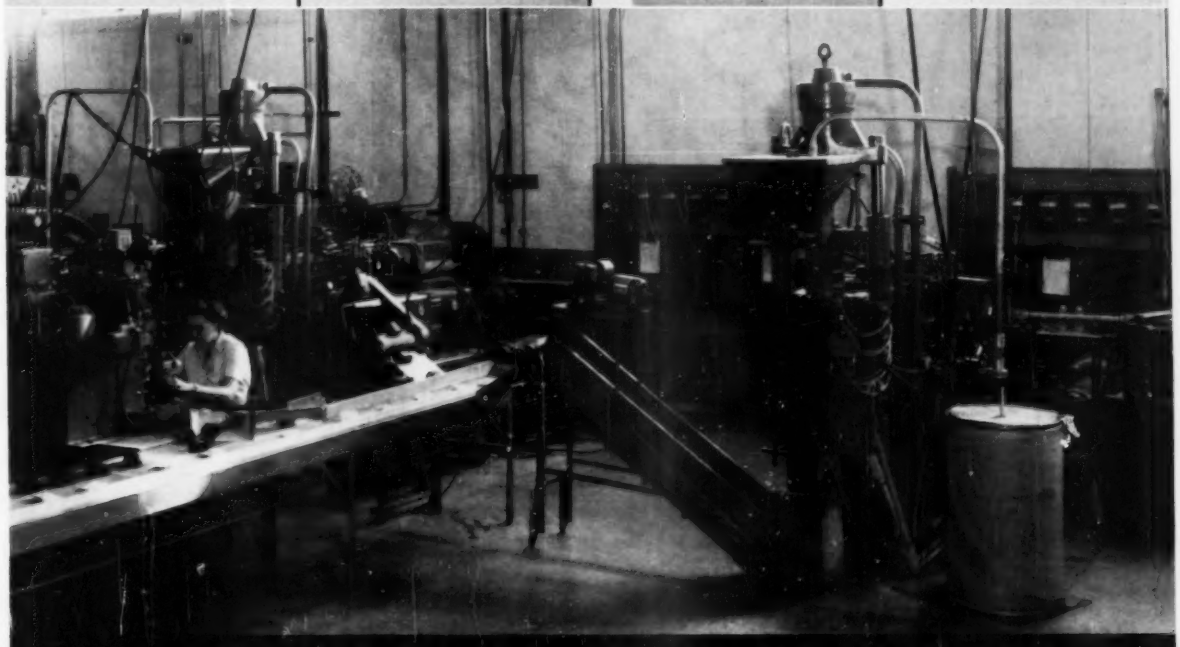
Chicago • Cincinnati
Cleveland • Detroit
Hastings-On-Hudson, N.Y.
Houston • Los Angeles
Philadelphia • Pittsburgh

HARSHAW

THE HARSHAW CHEMICAL CO.
1945 E. 97th Street • Cleveland 6, Ohio

FARRINGTON'S deluxe display packages.....





AROUND-THE-CLOCK, 6 DAYS A WEEK on *High Speed, Automatic* LESTERS

Farrington Manufacturing Company, which began 50 years ago with a patent on a tiny spring hinge as its only asset, is today the leading producer of high-fashion display cases for jewelry and other products. The majority of these beautifully styled cases are molded of plastics in Farrington's all-Lester injection molding department. To keep Farrington's customers supplied and satisfied, the cases must offer the finest in surface finish and precision assembly...and *they are molded on completely automatic cycles on high-speed 4-ounce Lester-Automatics!*

Mr. L. H. Woolley, vice president of Farrington's Packaging Division, comments about their Lesters: "We are enthusiastic and delighted with them and they have been responsible for keeping Farrington the leader in display packaging."

Mr. Charles Murphy, the chief engineer, adds: "Because of their dependability and versatility, we have been able, at very little expense, to convert our Lester machines to automatics. The simplicity of construction and ease of set up, as well as the excellent service rendered, gives us no maintenance problems."

There is a Lester to meet your molding needs: Write for information.

For a new slant on one problem of injection molding, write for your FREE copy of "Tom Swiftly and his Timed Machines."

LESTER-PHOENIX, INC.

2621-S CHURCH AVENUE • CLEVELAND 13, OHIO

Agents in principal cities throughout the world

of equipment for

INJECTION MOLDING

COMPRESSION MOLDING

TRANSFER MOLDING

BLOW MOLDING

EXTRUSION

Blow Molding Machines
with piston and screw feed
up to 215 pts

Automatic Serial Presses
for screw caps etc.

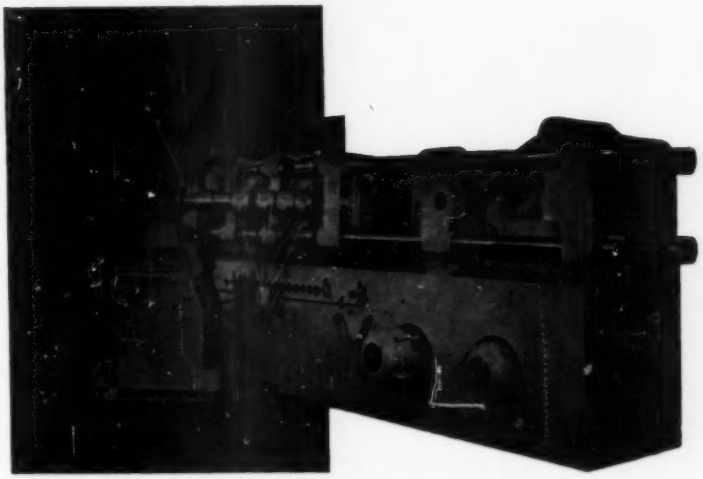
Compression and Transfer Molding Machines
up to 300 tons capacity

Extruders and complete Automatic Plants
(with screw diameters
1¼" 1¾" 2½" 3½" and 6" approx)

INJECTION MOLDING MACHINES

from 1/10 oz. upwards

with
SCREW PLASTICIZING
UNIT
from 1 – 350 OZS



BATTENFELD

CORPORATION OF AMERICA
959 W. Grace Street
CHICAGO 13, ILL.

Main Office and Plant
BATTENFELD MASCHINENFABRIKEN GMBH
Meinerzhagen/Westf., GERMANY

with Sales and Service-Organisations in
ENGLAND: Battenfeld (England) Ltd., Great South West Road, Bedfont, Feltham, Middx.
CANADA: HUSKY Mfg. & Tool Works (Ontario) Ltd., 200 Bentworth Avenue, TORONTO 13, Ontario
AUSTRALIA: W. J. HANDEL & Co., Pty., Ltd., 17 Paramatta Road, HABERFIELD, SYDNEY

Plastic surfaces have a rich sheen when molded with Lustre-Die

When molding containers, you'll find it a good rule to use Bethlehem Lustre-Die tool steel for machined cavity dies. Lustre-Die, because it takes a particularly bright polish, is ideal for imparting a bright sheen during the molding of plastic. This is because of its basic analysis, specially engineered to meet the exacting needs of plastic molders. But Lustre-Die tool steel also offers something extra—special alloy fortification, which makes this grade the undisputed champion among plastic-molding steels.

Lustre-Die is an electric-furnace steel. We coddle it during manufacture. Treat it like a baby. That's why it's a thoroughly clean steel, with little likelihood of porosity and surface pitting.

Be sure to try Lustre-Die in your plastic-molding operations. You'll agree that the sheen it makes possible is something really unique.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

U.S.I. POLYETHYLENE NEWS

A series for plastics and packaging executives by the makers of PETROTHENE® polyethylene resins

Packaging Notes

Skin suspension packaging with polyethylene film is being used with great success for shipping pottery and ceramic products.

The packages consist of a low density polyethylene skin suspension on a polyethylene-coated corrugated board. The coated board is perforated to allow a vacuum to be drawn through it. Then, products are placed on the board and 6-10 mil polyethylene film is heated, vacuum formed around the products, and heat sealed to the board. The completed unit is packaged in a corrugated container for shipment.

This packaging technique has cut gross shipping weight by 40%, and in-transit breakage has been reduced by more than 60%.

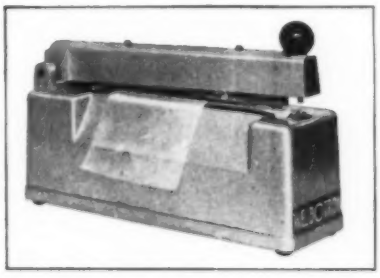
Now... polyethylene packaging for people!

A rectangular-shaped tent of polyethylene film is currently being marketed for use at football games and other outdoor sporting events. The tent is opaque except for a clear polyethylene viewing window. The tent keeps heat in — rain and snow out.

Polyethylene film packaging for carbon-steel tubes has proved to be economical for a New Jersey refinery.

Polyethylene film is wrapped around a cluster of tubes and taped securely closed. Wrapping with polyethylene in this way protects the tubes from rust and corrosion during storage.

Another advantage: packaging cost is said to be one-eighth that of the military-style moth balling the company formerly used.



A polyethylene bag sealer for small lots and laboratory use is now being marketed by a New Jersey Company.

The new compact polyethylene heat sealer is only 4 inches wide and 12½ inches long. It is portable and may be plugged into a standard 110 to 120 A-C outlet. The sealer will produce seals up to eight inches long. Sealing time is one-half to two seconds, according to the thickness of the film.

Improved Film-Clarity Meter Designed by U.S.I. Chemist

New Instrument Eliminates Human Error in Testing Clarity

A research chemist at U.S.I. has designed in conjunction with A.S.T.M. a new light transmittance meter which eliminates human error in testing clarity of polyethylene film. The instrument determines the relative amount of light transmitted through any film specimen at essentially a zero angle of scatter.

This new low-angle light transmittance meter was developed at the Polymer Service Laboratories of U. S. I.

The new meter is designed to replace the optical bench test . . . a method which depended on the operator's eye-sight. With the new meter, test results are recorded automatically, without relying on the judgment of the operator.

Operation of the Meter

Basically, the meter consists of a light source which is concentrated through a sample of film onto a light-sensitive cell. The cell is attached to a galvanometer which measures the amount of light passing through the sample to be analyzed.

Swatches of polyethylene film 1.5 mils thick were used as standard gauge samples by U.S.I. Care was used in handling the samples, since fingerprints on the film could cause variations as much as 10% in light transmittance.

Meters of this type are currently being evaluated by other laboratories in an A.S.T.M. round robin test.

New Polyethylene Packager Cuts Labor Costs by 50%

A west coast manufacturer recently announced a low-cost packaging machine which fills, closes and produces a finished bag in a single operation. It is designed to use bulk rolls of polyethylene film, and packages items which range in size from pencils to shirts.

The machine is said to cut packaging labor costs up to 50% through speed and efficiency of operation. The unit eliminates time-consuming hand loading of pre-manufactured bags. It reportedly eliminates set-up time, since no adjustment is necessary when changing from large to small size bags.

It is also reported that the machine can be operated by personnel who have no previous training or experience in packaging.

Now... Disposable Boots of Clear Polyethylene!

Low in cost, but high in protection are features claimed for newly introduced clear polyethylene boots. These disposable boots are easily pulled over regular shoes, and can be worn open at the top or closed with a rubber band.

Uses suggested for these inexpensive boots include biological and atomic laboratories where control of contaminated elements is vital.

The manufacturer currently packages his product in rolls of 50 and 100, and says average cost is less than 14¢ per pair. The boots are watertight, and last for several hours before wearing through, it is claimed.

Polyethylene Pipe Solves Difficult Tamping Job

Polyethylene pipe has been put to an interesting use in blasting operations for a new Potomac River water treatment plant near Washington, D. C.

A total of 62 holes were drilled to prepare a 110 ft. high cliff for blasting. Fourteen of these holes were from 35 to 96 feet deep and drilled at an angle of 32°. Since the density of the rock formation varied, there was a chance that the bore holes would swing out of line by several feet. Of major concern was the problem of loading and tamping blasting charges to the required depth in the crooked holes. Conventional, non-flexible, metal rods quite obviously would not do the job.

The blasting contractor solved the problem by using 1½" intermediate density hollow polyethylene water pipe. The highly flexible polyethylene tamping "pole" was made up of several sections of pipe.

It easily took the bends in the holes and was used successfully to tamp all required blasting caps and powdered charges in place.

DO YOU HAVE a new polyethylene packaging development you'd like the industry to know about? Make it routine to send your information on new developments to U.S.I. POLYETHYLENE NEWS.

Address the Editor,
U.S.I. POLYETHYLENE NEWS, U. S. Industrial Chemicals Co., Division of National Distillers and Chemical Corp., 99 Park Avenue, New York 16, N.Y.

exceptional moisture and grease resistance

POLYETHYLENE-COATED KRAFT OPENS UP NEW OPPORTUNITIES FOR CORRUGATED BOARD

Polyethylene-coated corrugated board — produced on conventional corrugating equipment — is extending the usefulness of corrugated into many new packaging applications.

This unique container board has exceptional moisture and grease resistance and a glossy, non-abrasive liner surface that will not scratch or mar package contents.

Extruders who produce polyethylene-coated kraft liner board can get these extra advantages by using U.S.I. PETROTHENE® polyethylene resins:

HIGH PRODUCTION RATES—PETROTHENE resins have good drawdown properties, permit extrusion at high speeds.

EXCELLENT ADHESION — with minimum hot melt oxidation.

NO ODOR — an important consideration in many packaging applications.

Contact U.S.I. for information on PETROTHENE resins especially suited for coating kraft liner board.

Packagers are investigating polyethylene-coated corrugated board for applications like these:

Bulk shipment of meat, where moisture and grease-proof interiors reduce weight loss of the meat and keep moisture from weakening the carton.

Shipment of furniture and other hard goods, where abrasion damage from the container has been a problem.

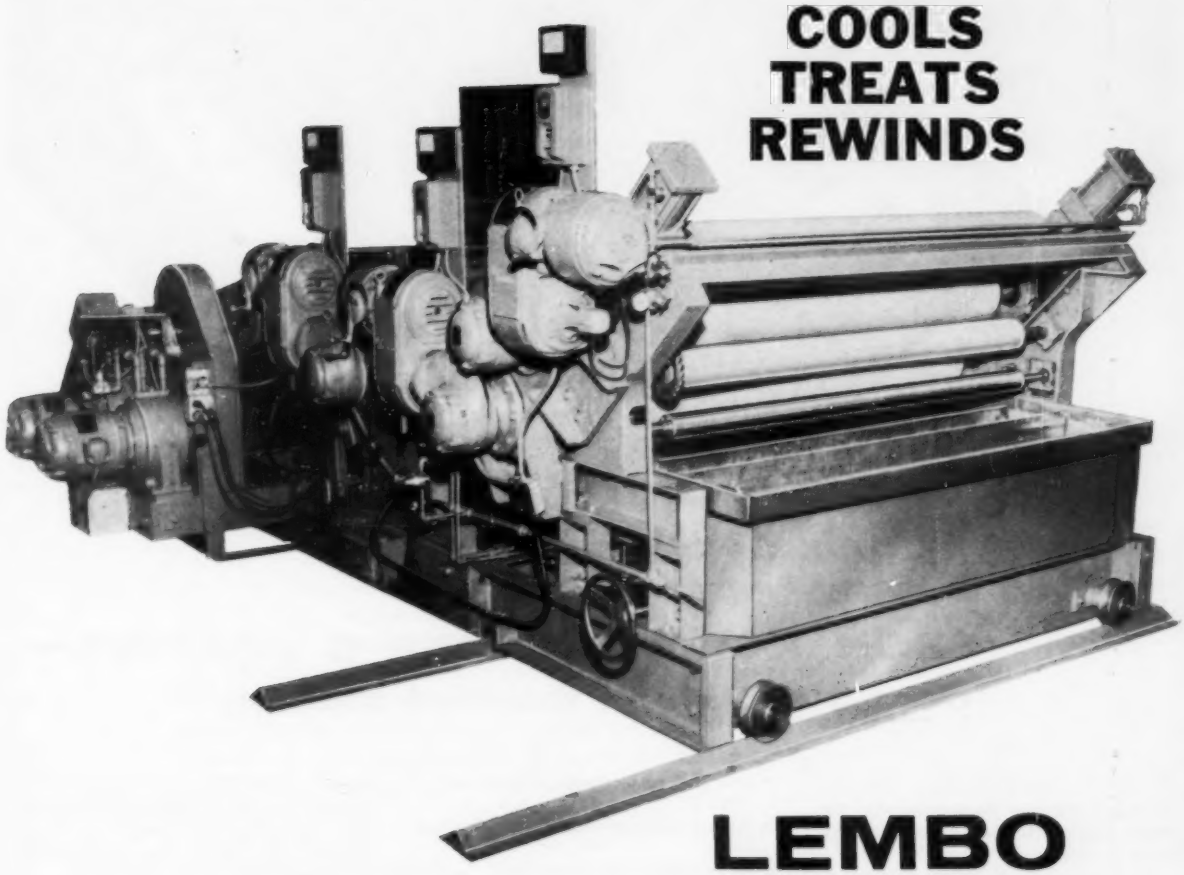
Bulk bakery and confectionery shipments, where absence of grease-wickage makes containers suitable for reuse as point-of-sale displays.

In concrete construction forms, where the polyethylene coating acts as a release agent.

U.S.I. INDUSTRIAL CHEMICALS CO.
Division of National Distillers and Chemical Corp.
99 Park Ave., New York 16, N. Y.
Branches in principal cities

triple-
FILM HAUL-OFF
duty

COOLS
TREATS
REWINDS



LEMBO

MACHINE WORKS, INCORPORATED
248 EAST 17TH STREET
PATERSON 4, NEW JERSEY
LAMBERT 5-5555

Cable Address: Lemco, Paterson

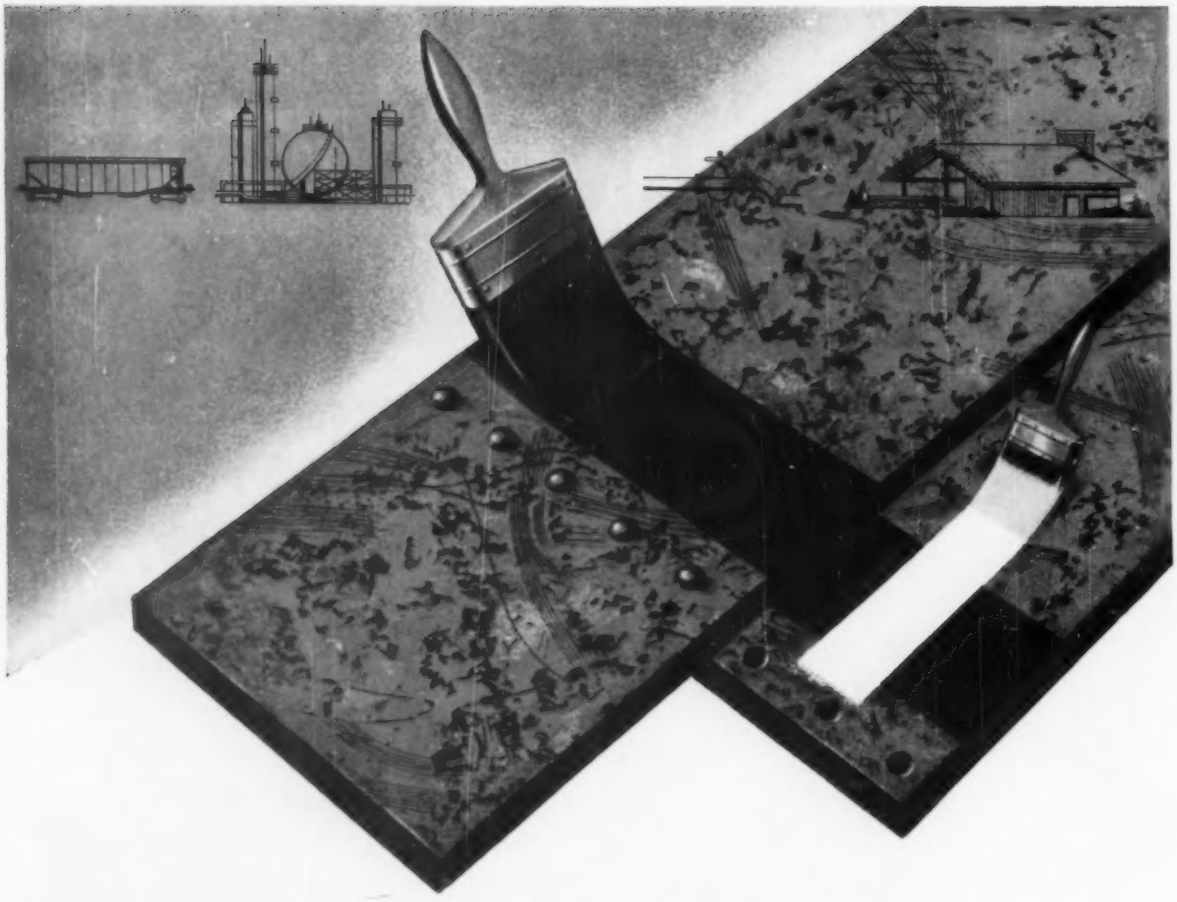
Mfrs. PRESSES • EMBOSSERS
LAMINATORS • ROLLERS

At the critical final stages of film processing, you should have the versatile Lembo Film Haul-Off for uniform quality at low-cost. Components include: (a) Bath-type cooling or casting roll units, (b) film treating and slitting unit, and (c) turret rewind with automatic cut off.

Each component section is track mounted and equipped with its own variable speed drive to assure uniform film tension control. Hard straight edge rolls without telescoping. For precision finishing of polyethylene and other film, we suggest you **look to Lembo.**

There is only one Lembo Machine! Be cautious of "Lembo-type" imitations.

AIR-BORNE SERVICE
Private fleet speeds our engineers and field service experts to you.



Important new development!

EPON® RESIN-BITUMEN C COATING— cold blend, high thermal stability

Now—for the first time—you can obtain complete compatibility between Epon resin and a heavy petroleum fraction.

Shell Chemical research has made it possible for you to combine Epon 828 liquid resin with a low-cost, petroleum-based material, *Bitumen C*. The resulting surface coating has a number of excellent properties never before attainable in a bituminous coating material:

- Cold blending—no heating of pitch necessary
- Various film builds—up to 15 mils in one coat
- No pinholing—even in thin films
- Can be overcoated with white
- Imparts high thermal stability to bituminous coatings
- Permits use of conventional curing agents
- 2-hour pot life

This outstanding new Epon resin-Bitumen C coating is ideal for a wide range of anti-corrosion and waterproofing applications. To suggest just a few: pipelines, chemical plants, hopper cars, sewer pipe, waterproofing basements.

Both Bitumen C and Epon resin are available from Shell Chemical. Get off to a head start on this extraordinary new surface coating development by getting complete information. Write or phone your nearest Shell Chemical district office.

SHELL CHEMICAL COMPANY
PLASTICS AND RESINS DIVISION

Central District	East Central District	Eastern District	Western District
6054 West Touhy Avenue	20575 Center Ridge Road	42-76 Main Street	10642 Downey Avenue
Chicago 48, Illinois	Cleveland 16, Ohio	Flushing 55, New York	Downey, California

IN CANADA: Chemical Division, Shell Oil Company of Canada, Limited, Toronto

SHELL

THE PLASTISCOPE*

News and interpretations of the news — By R. L. Van Boskirk

Section 1 — **February 1960**

Vinyl chloride expansion. As might be expected in an industry that grew from a volume usage of 650 million lb. in 1958 to 830 million or more in 1959, an expansionist movement is under way like that following the big growth in 1955. Most of the producers, both old and new, are increasing capacity. Total industry capacity will soon reach 1.2 billion lb., which is well in advance of the consumption figure.

Latest announcement of expansion comes from B. F. Goodrich Chemical, already thought to be the largest-volume producer of vinyl chloride resins in the business. A new polymer plant in Watson, Calif. is expected to be completed during the second quarter of 1960. There is only one other vinyl chloride polymer facility on the West Coast. That is the Keysor plant, where production capacity is limited to a few million pounds per year and whose output goes largely for phonograph records.

Vinyl monomer for the Goodrich plant will be supplied by American Chemical Co.'s nearby petrochemical operation. American is a company jointly owned by Stauffer Chemical and Richfield Oil.

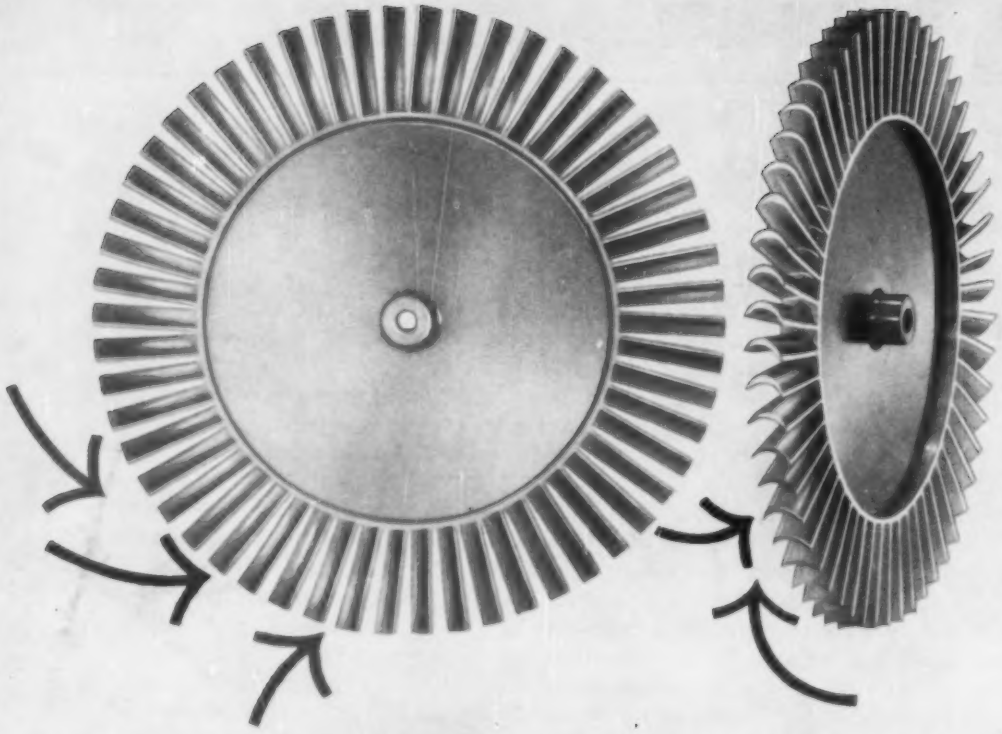
Other plants where Goodrich produces vinyl chloride are at Avon Lake, Ohio; Louisville and Calvert City, Ky.; and Niagara Falls, N. Y. The company also operates several foreign plants.

Borden doubles capacity. The Borden Chemical Co., which entered the vinyl chloride industry with a polymer plant at Leominster, Mass. several years ago, has announced plans to build a new 40-million-lb. plant in Illiopolis, Ill. Engineering for the project is about completed. Resins for flooring, records, solution coatings, extrusions, and specialties will be produced in addition to compounding. Capacity at the Leominster plant was recently increased to a reported 40 million pounds annually. The company now produces a range of materials that include polyvinyl acetate, butadiene-styrene and acrylic emulsions, and polyvinyl alcohol.

Molded and extruded plastics. Inquiries received at this office indicate that our comment concerning present and future consumption of extruded and molded plastics has been frequently misinterpreted. The comment (MPl, Dec. '59, Plastiscope, p. 39), referred to a talk by J. K. Honish of Union Carbide Plastics before the Chemical Marketing Research Association in which he stated that around 1.67 billion lb. of plastics would be molded or extruded in 1959. This figure was erroneously reported in this column as including extruded film. Mr. Honish's estimate did *not* include extruded film, which he lists as another segment of the plastics industry apart from conventional extrusion.

The confusion is further compounded by a molding and extrusion chart on p. 91 of Jan. '60, MPl, which lists an estimated figure of around 2,168,000,000 lb. consumption in 1959. However, the MODERN PLASTICS figure included polyolefins, polystyrene, vinyl, cellulosic and miscella- (To page 41)

*Reg. U. S. Pat. Off.



More power to Sunbeam vacuum cleaners with this Chicago Molded turbine fan

One of the principal features of the new Sunbeam "Dual De-Luxe" Vacuum Cleaner is the turbine brush. This brush is driven by a unique one-piece turbine fan wheel molded of Nylon. It is believed to be the first plastic single piece molding of a fan incorporating the turbine principle. The fan wheel is made up of 56 curved blades, so spaced as to allow for intake of paper clips, hairpins and similar objects. Nylon was selected for its flexibility and resistance to this metallic impact.

Obviously, this intricate piece presented molding problems. Engineers of Sunbeam and Chicago Molded worked closely together. The answer was a most unusual and complex mold incorporating 56 individual sliding side cores, one for each blade.

Once again the broad experience of Chicago Molded, their knowledge of materials and methods, and their mold-making skill, have combined to lick a tough problem. These important advantages are yours when you deal with CMPC. Why not talk things over with us? Just write or phone. There's no obligation.

See Sweet's Product Design File 2c/Ch, or send for new brochure "Design and Purchase of Custom Molded Plastics."

CMPC

CHICAGO MOLDED PRODUCTS CORPORATION
1020 A North Kolmar Avenue
Chicago 51, Illinois

THE PLASTISCOPE

(*Continued from page 39*)

neous film extruded from a die (including blown film) in the amount of somewhere around 400 million pounds. When this figure is subtracted from the 2,168-million-lb. total, it is fairly close to the Honish estimate for total extrusion and molding exclusive of film.

There was also a puzzling report that this observer's comment leaned to a belief that Mr. Honish's estimate of 2.8 billion lb. for 1965 was overoptimistic. On the contrary, we believe that Mr. Honish was extremely conservative. He frankly stated that his estimates were based on population growth, plus an increasing use of plastics per capita as shown by past trends. Many analysts believe that plastics growth will be at a much greater rate of increase than population for at least the next decade.

National Cleveland Corp. stretches out. A Plastics Chemical Div. has been added to National Cleveland's plastics activities, with headquarters at 1984 State St. Ext., Bridgeport, Conn. Initial offering of the new firm is a group of inks, paints, lacquers, and coatings for use on flexible or rigid polyolefins. It is asserted that in some cases these coatings require no pretreatment of material before application. A research program has been undertaken with the Flexabar Corp., Rockleigh, N. J. National Cleveland entered plastics with the purchase of Auto-Vac Co., manufacturer of equipment for vacuum and pressure forming thermoplastics, in 1958, and later formed a subsidiary, Auto-Blow Corp., to produce blow-molding equipment. National was established in 1904 as a producer of special cutting tools.

Teflon 100 now commercially available. Much has been written about this material, but heretofore it has been available only in limited quantities and at $19 a pound. Du Pont has announced that it is now available in commercial quantities at a price of $11.60 a pound.

Known as FEP fluorocarbon resin, in contrast to the older TFE fluorocarbon, Teflon 100's great advantage is that it can be extruded, injection molded, compression molded, and blow molded in conventional plastics processing equipment. TFE must be processed in a more difficult manner similar to that for powdered metals. The base price of TFE is only $3.60 a pound, but the cost of finished products from Teflon 100 will be little more than those made from TFE because it is much easier to process.

Teflon 100, like TFE, is said to be virtually immune to chemical attack, to have excellent electrical insulating properties, anti-stick and nonfrictional characteristics, and not to absorb moisture. It has about 100°F. less heat resistance than TFE—around 400°F. for continuous service, which is still much higher than most thermoplastics. The resin is said to have more impact resistance than any other plastic at low temperature, and thus can be used for liquid oxygen seals. Some plastics are stronger at room temperature, but most of them are degraded at temperatures over 300°F. Teflon 100 is virtually unaffected by weather and remains unchanged when subjected to ultra-violet light and ozone attack. In addition to use in electrical applications it is suggested for chemically resistant hose, lined pipe, bearings, seals, piston rings, packings, and gaskets.

Du Pont's Film Department has been marketing film (T page 43)

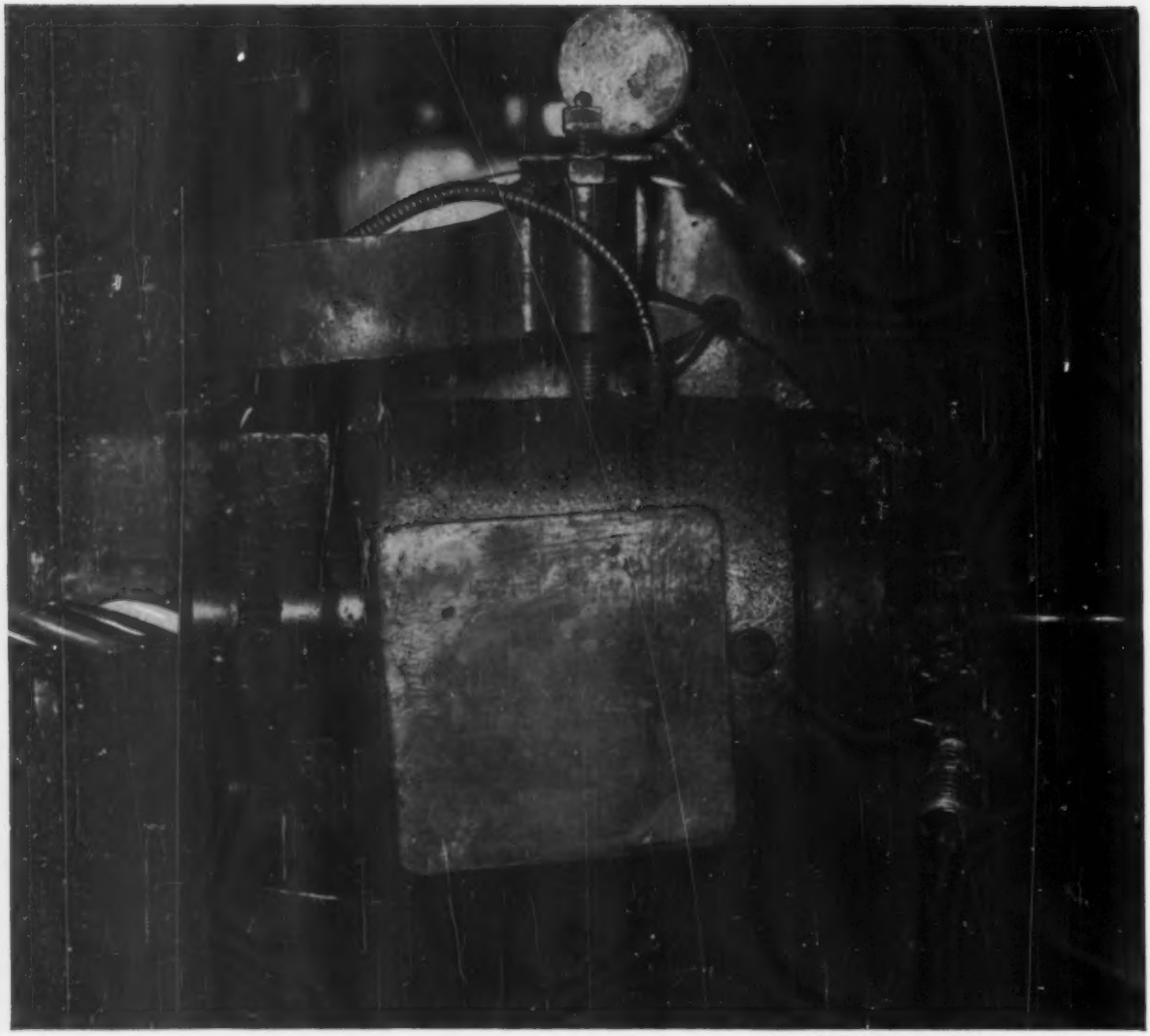


Photo courtesy Ideal Wire Products Co., Lowell, Mass.

Need a quality resin accepted and approved for electrical applications?

VYGEN 120 PVC resin is UL-approved as interchangeable with other quality PVC resins for wire insulating applications. VYGEN 120 is specially formulated for fast economical dry-blend extruding, with monomeric or polymeric plasticizers. It assures a lack of gelled particles . . . provides excellent heat and light stability plus exceptionally long life. See how VYGEN can help your products . . . speed your production . . . send for complete technical literature today!

VYGEN®

VYGEN 6812 COMPOUND
UL approved for UF-NMC cable. Type T, TW, 60° C Oil, and 80° C appliance wire applications. May also be used as primary insulation for other cable constructions and jacketing.

VYGEN 6035 COMPOUND
UL-approved for Type T, TW, and exposure to oil use at 60° C. This compound combines excellent physical and electrical properties with very good weather and flame resistance.

VYGEN 9221 COMPOUND
Meets UL requirements for 90 and 105° C applications. Recommended for appliance, radio hook-up, machinery wire, etc. where heat resistance and good physical properties are required.

Creating Progress Through Chemistry

GENERAL — Chemical Division

THE GENERAL TIRE & RUBBER COMPANY
Chemical Division · Akron, Ohio

Chemicals for the rubber, paint, paper, textile, plastics and other industries: **GENTRO SBR** *rubber* **GENTRO-JET** *black masterbatch* • **GEN-FLO** *styrene-butadiene latices* • **GEN-TAC** *vinyl pyridine latex* **GENTHANE** *polyurethane elastomer* • **ACRI-FLO** *styrene-acrylic latices* • **VYGEN PVC** *resins and compounds* • **KURE-BLEND** TMTD *masterbatch* • **KO-BLEND** *insoluble sulfur masterbatch*

THE PLASTISCOPE

(*Continued from page 41*)

made from Teflon 100 for some time, and recently reduced the price from $29 to $15 a pound.

Teflon 100 is a copolymer of two gases—hexafluoropropylene and tetrafluoroethylene. The letters FEP stand for fluorinated ethylene propylene. In the older Teflon the letters TFE stand for tetrafluoroethylene.

Vinyl chloride flooring. No better proof of the impact made by vinyl chloride on the floor covering market can be found than Goodyear Tire & Rubber Co.'s statement that hereafter the company would concentrate on vinyl flooring. Goodyear was a pioneer and one of the largest producers of rubber floor covering. The company has just completed a multi-million dollar expansion of vinyl manufacturing facilities in Akron, Ohio, which more than doubles flooring production capacity. J. S. Bruskin, general manager of the company's Films & Flooring Div., predicts a 50% sales increase for his company in 1960 over record-breaking 1959. Goodyear concentrates on the solid vinyl type floor covering and is now introducing a new 6-ft. wide roll which virtually eliminates installation seams and will be in the retail price range of linoleum.

Use of vinyl resin for flooring has increased from 56 million lb. in 1955 to almost 160 million in 1959. In addition to competing with rubber it has also taken over a good portion of the asphalt tile market, and last year it moved more strongly into the felt-based flooring market when several of the larger companies not formerly heavily engaged in vinyl flooring moved into this market with a plastisol coated material.

Process for fabricating large articles. Spencer Chemical has concluded an agreement with the Vaessen-Schoemaker Co. of Holland to license prospective users of the Engel Process in the U. S. The process is reportedly a low-cost method of fabricating large articles such as boats or bathtubs with a special type of powdered polyethylene or other thermoplastics. It involves fusing of powdered material in an oven and can be adapted to forming hollow articles of large size in an inexpensive mold. Full details on this process, including information on exactly how it works, illustrations of items produced by it in Europe, and markets foreseen for it in this country, will appear in a forthcoming issue.

Delrin price reduction. Du Pont has announced a new price of 88¢ a pound for Delrin acetal resin from its previous price of 95 cents. The new price was announced simultaneously with the company's statement that Delrin is now available in commercial quantities from a new plant at Parkersburg, W. Va., in black, natural, and some standard colors. The former 95¢ price was approximately the equivalent of the cost of nylon because of the difference in specific gravity between the two materials. Du Pont states that lower Delrin prices may be expected as markets increase.

The price cut is perhaps most significant in the field of die cast products where Delrin is being intensively marketed to compete with metals such as zinc and aluminum. Original cost of the material is more, but the costs of finishing are much less for Delrin. In some cases it may result in costs of 60 to 80% less than brass.

(To page 45)

No matter what your product, process or problem involving white pigmentation, look to TITANOX® pigments and our technical service for the answer. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; offices and warehouses in principal cities. In Canada: Canadian Titanium Pigments Ltd., Montreal.

7539

THE PLASTISCOPE

(*Continued from page 43*)

Dow expands polyethylene capacity again. Dow may have been somewhat slow getting into production of polyolefins, but the company is certainly moving fast now toward becoming a big factor in the industry. The latest announcement says that the company's capacity at Freeport, Texas will be increased by 67% in 1961. Last May the company doubled its capacity for the second time in a year at Freeport. This is thought to have totaled about 100 million pounds. In addition, a plant at Plaquemine, La. is expected to be ready in the last quarter of 1960. The above plants produce low- and intermediate-density resins by the high-pressure process. In addition to the above, Dow has low-pressure or high-density plants in Bay City, Mich. and Sarnia, Canada. Dow's announced propylene plants are in Bay City, Mich. and in California.

Polystyrene sheet. Plax Corp. has reduced the price of Polyflex 100, a biaxially oriented polystyrene sheet, by 12 percent. Typical of the new price schedule is an 11¢/lb. reduction in carload orders of 0.010-gage material. It was formerly 68¢/lb. and is now 57¢. Plax claims this sheet is now priced at 30 to 40% below other clear plastics sheet. The material is asserted to be non-toxic and is used for food or other containers, blister packs and various industrial uses.

Phenolic-kraft board. Consolidated Paper Co., Monroe, Mich., is now producing a phenolic impregnated kraft paper-board with 25 to 40% resin by weight in sheets up to 66 by 72 in. and 0.060 to 0.200 in. thick. Other combinations, including thermoplastics, are being developed. The new board is claimed to be strong, stable, resilient, and a good sound insulator. It provides a base for baked-on-enamel and adhesives. Products already formed include luggage, air ducting for autos, duck decoys, gaskets, and store mannequins. Products yet to come include large toys, small household furniture, and electronic housings.

Heat resistant polystyrene. Dow Chemical has introduced a new heat resistant general purpose polystyrene (Styron 690) with emphasis on "toughness" that is claimed to meet or exceed current general purpose toughness standards in the country. There are no color limitations on this material; its average heat distortion point is 20% higher than regular general-purpose formulations, according to Dow. There is no price premium—it sells at the general purpose price is 21½ cents. Suggested applications are radio cabinets, brush bristles, packaging, battery cases, television lenses.

Heavy duty. Owens-Illinois Glass Co. will soon begin production of heavy-duty polyethylene shipping sacks with film made from Phillips rubber-modified high-density resin; but officials state this is not necessarily a permanent choice. The company is also experimenting with various thicknesses centering around 5 or 6 mils. There are now several firms producing or about to produce similar bags for this market, which is expected to become one of the largest-volume outlets for high-density polyethylene film.

For additional and more detailed news see Section 2, starting on p. 206

LETTERS TO MODERN PLASTICS

Where readers may voice their opinions on any phase of the plastics industries. The editors take no responsibility for opinions expressed.

In rebuttal

Sir: We would like to thank A. Jung for his comments (MODERN PLASTICS, Dec. 1959) on our paper (Injection molding—a rheological interpretation—part 1, MODERN PLASTICS, Sept., 1959). His major point concerns the compressibility of polymer melts and our assumption with regard to compressibility to which we would like to reply.

1. Quoting from "Processing of thermoplastic materials," Chap. 1, "Flow behavior of thermoplastics," by A. B. Metzner, p. 34, "No experimental data of polymer (flow) over a wide range of pressures appears to be available." Page 34 F. N. "A recent paper (by B. Maxwell and A. Jung) discusses this problem but unfortunately does not separate changes in apparent viscosity due to varying shear rate from pressure-induced changes. While one can conclude that the true effects of pressure above must be much smaller than reported by these investigations, their actual magnitude remains unknown."

2. Even if the results reported by Maxwell and Jung were free of controversy, the application of their findings to our work would appear to be of a secondary nature. We assumed that in the polymer melt compressibility could be neglected for the main purpose of giving the same mean *velocity* along the die cavity at any time. This is true within 5-6% as shown by the Boyer and Spencer equation of state for polystyrene. As far as pressure effects on *viscosity* are concerned, if they exist, then the constants in the empirical power law for stress vs. rate of strain are functions of pressure and a slight modification of the final calculation procedure is required. In our rheological measurements there was no pressure effect apparent.

3. His other point concerns our efforts to develop a "truly accurate flow equation for an actual molding operation in view of the many vague and uncontrollable variables." We have shown that this can be done in the case of dies of simple geometry. The same variables probably hold in a more complicated die but the difficulty arises from the difficulty in handling mathematically the many specific situations arising in every die. This however does not detract from the basic fact that the primary independent variables are now known and are no longer vague and uncontrollable.

R. L. Ballman
Tevis Shusman
H. L. Toor
Carnegie Institute of Technology
Pittsburgh, Pa.

It's the industry's business

Sir: I note with some misgivings that the chemical industry has requested the Federal Trade Commission to formulate a set of trade practices for fluorocarbon makers, and that the FTC is now in the process of writing such regulations.

As a member of the Society of the Plastics Industry, it seems to me that trade practices are not a subject of governmental regulation but something that should be treated by the members of the industry.

A recently published item states that "the FTC action attempts to curb a variety of unfair practices including misrepresentation of materials standards (the commission has asked the Commerce Dept. to set commercial standards), substitution of products, deceptive invoicing, cost cutting, fictitious prices and price lists, and false disparagement of competitor's product."

You will note further that the chemicals industry itself has asked for this control of so called "unfair practices."

If ever I saw a request by American business to the government for interference in their affairs, this is it. The plastic industry has overcome the stupid practices of the cut-throat manufacturer in the past many times. You recall the improvement in the vinyl sheet business, improvement in quality of materials in toys, and many other areas where the plastic industry has policed itself to a point where it is possible now to hear expressions such as "it must be good, it's made of plastic." You will note further that many advertisements point to plastics as a symbol of quality, and you know that as far as quantity is concerned there aren't enough animals in creation to supply the enormous demand for upholstery materials to cover our furniture. The public today finds it difficult to differentiate between leather and plastic in this industry. This is a result of self regulation.

The reason for this outburst is simple. The government has been invited to step into a situation which should be governed and controlled by industry and where government once gets a foothold and establishes a precedent you will find that someone in the near future will be yelling about government interference in industry.

Bernard Thal
Plastics Manufacturer's
Representative
Boston, Mass.

Skin packaging patent

Sir: We appreciate your sending us a tear sheet from the December 1959 issue of MODERN PLASTICS.

In writing up the news of our being granted a license for the skin packaging patent owned by Union Carbide Development Co. of Canada, an ambiguity has been created.

We have the exclusive rights to the process for Canada and have been actively engaged in skin packaging in Canada for 2½ years. We have had this exclusive right through contract with the original inventor prior to the patent being acquired by Union Carbide Development Co. We write you in the hope that you will publish an amended news announcement because similar misstatements in the Canadian Press have created a misunderstanding among people who are contemplating skin packaging and they are approaching Union Carbide for a license instead of ourselves; and, in some cases, taking exception to the part statement.

We have added 10,000 sq. ft. to our present building for the purpose of taking care of the constantly increasing volume of custom and proprietary skin packaging. We also represent Flex-O-Glass Corp. of Chicago, Ill. for vinyl film and Abbott Plastic Machine Corp. of Chicago, one of the leading manufacturers of vacuum forming and skin packaging equipment in your country, and, last but not least, we print, coat, and score and otherwise prepare master cards preparatory to skin packaging, both for ourselves and our group of licensees.

Eric H. Hardman, Pres.
Eric H. Hardman Ltd.
Brantford, Ontario, Canada

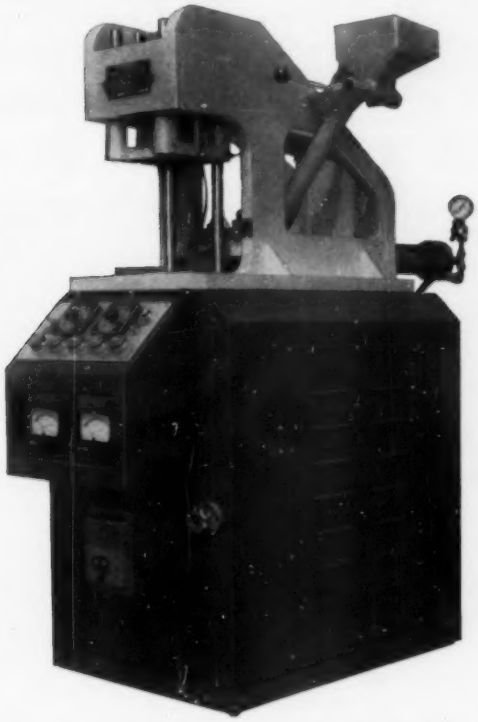
The profitable way to injection molding

of parts up to 1½ oz. especially those involving inserts or loose cores

MINI-JECTOR

Reg. U.S. Pat. Off.

PLASTIC INJECTION MOLDING MACHINES



Super Eldorado MINI-JECTOR
Model 70VC105

Features:

- Semi-automatic operation
- No front tie rods to hinder free access to mold area when mold is open
- Vertical clamping. Inserts or loose cores remain undisturbed because bottom of mold is stationary at all times.
- Approx. 18 tons clamping pressure.
- Hydraulic power, self-contained
- Capacity up to 1½ oz. (vinyl)

Precision parts in an endless variety—sub-miniature to 1½ oz.—are production molded at low cost on versatile, efficient MINI-JECTOR plastic injection molding machines.

Among MINI-JECTOR outstanding advantages are: *Low mold cost*—mold blanks as low as $29.50; *Low initial cost*—models start under $1,000 complete. MINI-JECTORS mold all thermoplastics, including nylon.

There's a MINI-JECTOR to solve your molding problems

Two of the stock MINI-JECTOR models. *Left*—"Wasp", available with air or hydraulic power. Uses small "V" molds. Capacity up to ¾ oz. *Right*—"Hornet" model features horizontal clamping with mold area of 6" x 5⅛" x 5". Capacity up to 1 oz.

Send for FREE catalog—NOW!

New, illustrated, 56 pages of useful information. Shows low-cost way to develop and produce wide variety of molded items (sub-miniature to 1½ oz.) in all thermoplastics by modern, profitable methods. Gives detailed specifications, technical data on performance, applications. Complete price list for all models. Mail coupon today!

NEWBURY INDUSTRIES, INC.
Box 11, Newbury, Ohio

Please send me the FREE catalog

Name .....

Company .....

Address .....

City ..... State .....

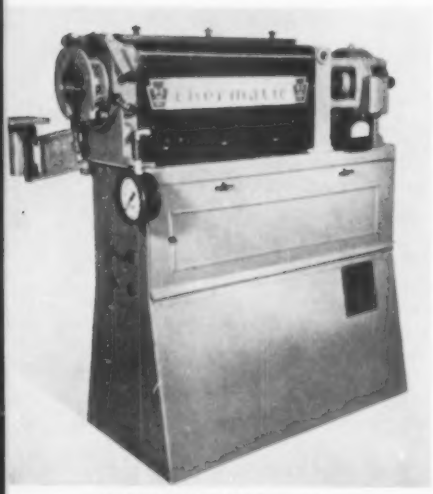
For convenience fill in, attach to company letterhead and mail

NEW MACHINERY-EQUIPMENT

Specifications, claims made, and prices appearing in these pages are those of the manufacturers or sellers of the machinery and equipment described, or their agents.*

Extruder

Designed for speeds up to 400 r.p.m. and production rates of 100 lb./hr. at 3000 p.s.i., Thermatic Model 15T 1½ in. extruder can be used for laboratory and experimental production work. The model utilizes deep



DAVIS-STANDARD Thermatic Model 15T, 1½-in. extruder can be supplied with a vented barrel.

aluminum fins for cooling. Each heating zone along the barrel is equipped with a separate fin and blower with dampers for temperature control. Cylinder is of one piece construction with an integral Xalloy liner. The feed section is a special alloy one-piece casting. The stock screw is cored for water cooling. Drive is provided by V-belts operating from almost any gearhead type motor. Power capacity ranges from 5 to 25 hp. *Davis-Standard, Division of Franklin Research Corp. Mystic, Conn.*

Pre-expander

The Dobar Steam Pre-expanders, Models S505, M605, L705, for expandable polystyrene will produce material with densities between 0.8 and 3 lb./cu. ft. Production rates vary with the model and the density of the foam to be produced and will range from 20 to 600 lb./hr., depending on the mode of operation. Expansion takes place as follows: unexpanded beads fall from a hopper into a funnel which guides them into a venturi into which steam is introduced horizontally. The suction created in the venturi pulls the beads into an agitated tank where a continuous flow of steam expands them. As the beads expand they become lighter and rise to the top of the tank where they are discharged. Steam pressures range between 10 and 20 p.s.i. The unit requires a minimum steam supply of 60 p.s.i. and electric power to drive the agitator motor. Floor space requirements for layout unit are about 3 by 3 feet. No licenses are required for the operation of the unit, according to the manufacturer. *Polystyrene Machinery Div. Miller & Van Winkle Co., 155 Sherman St., Paterson, N. J.*

Vacuum pumps

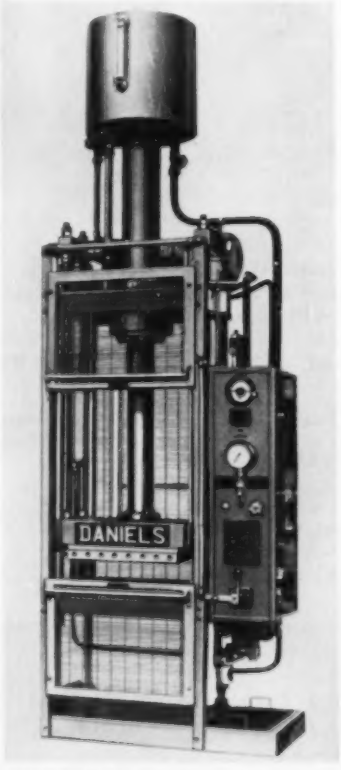
Nine new models of oil-sealed, rotary, positive-displacement, mechanized vacuum pumps are available in single- and double-stage models. Ultimate pressure is 0.002 mm. Hg with single stage pumps and 0.00002 mm. Hg with double stage pumps. The rated capacities of the pumps range from 7 to 106 cu. ft./min. Each pump is equipped with a gas ballast to speed evacuation of large volumes of water vapor which can be by-passed when water vapor conditions are not severe or when down pressures are required. Noise even at high speeds and low pressures has been eliminated by the use of an air valve suppression port and by static and dynamic balance of the entire piston drive assembly. Modular design of the pumps provides maintenance flexibility through the use of interchangeable pump parts. Prices range between $750 to $1860. *Consolidated Vacuum Corp., Rochester 3, N. Y.*

Pyrometer

Consisting of a hand-held temperature indicator and a surface contacting tracer with a thermocouple head, pyrometer is available in standard ranges up to 1800° F. The unit is self contained and has automatic cold end compensation included. A variety of thermocouple heads is available including disk, band, ribbon, and needle forms. All tracers are interchangeable and can be either rigidly or flexibly attached to the indicator. The instrument comes in a wooden case which holds the indicator and up to four surface tracers. *Epic Inc., 154 Nassau St., New York 38, N. Y.*

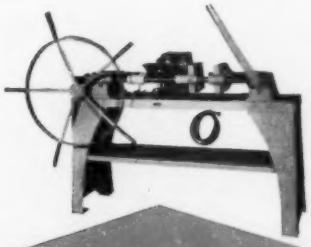
Reinforced plastics presses

Low-pressure presses for reinforced plastics molding come in two sizes: 150 and 30 tons. The 150-ton size is for the production of radomes and like items. Maximum stroke is 75 in. with daylight of 160 in. between 54 in. sq. platens. Working pressure is variable between 10 to 155 tons and opening load is 15 tons. Closing speed is 6 in./sec.; opening speed 5 in./second. The 30-ton press is recommended for smaller items. Maximum stroke is 36 in. **(To page 50)**



DANIELS 150-ton low pressure molding press is one of two units designed for reinforced plastic molding.

* Prices are deemed to be F.O.B. sellers' plants (unless otherwise stated), are for "standard" models, and are subject to change without notice. The publishers and editors of MODERN PLASTICS do not warrant and do not assume any responsibility whatsoever for the correctness of the same, or otherwise.



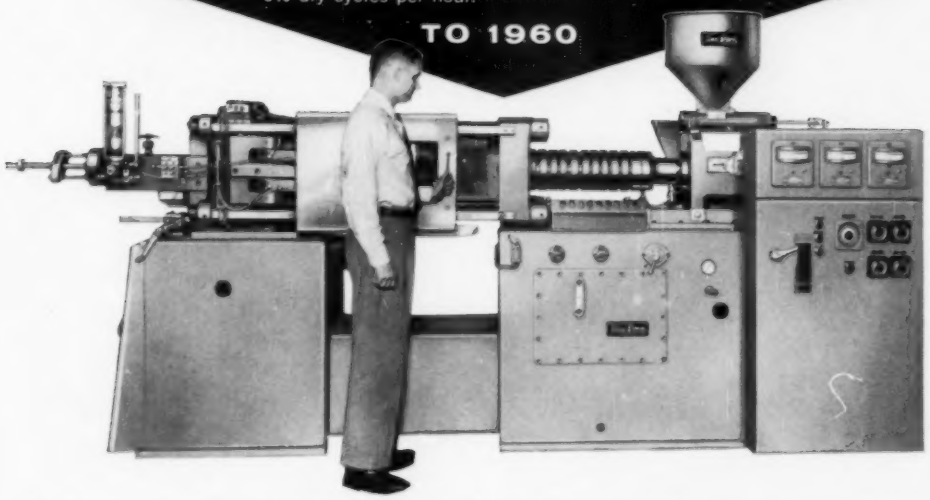
FROM 1946

14 years ago, Van Dorn produced this hand-operated press. It was specifically designed for experimental work, training schools and laboratories. Many of these rugged units are still in service throughout the world.

Progress in Plastics by VAN DORN

Satisfied users of early Van Dorn machines have steadily asked for larger units. Van Dorn's progress is now climaxed by this fully automatic 4-6 oz. Model 400. It plasticizes 100 pounds plus per hour, has 175-tons clamping pressure and achieves up to 840 dry cycles per hour.

TO 1960



Established in 1872, Van Dorn has steadily expanded its facilities and diversified over the years. Entering the plastic machinery field after World War II with the simple press shown above, Van Dorn now has an extensive line of ultra-modern, fully automatic plastic injection machines.

Besides producing top quality presses, Van Dorn offers the plastic industry these plus benefits:

PROMPT SPARE PARTS SERVICE

Maintaining a complete inventory of spare parts, Van Dorn is geared to facilitate your needs by prompt attention and quick shipment.

DEMONSTRATION DEPARTMENT

We maintain a complete battery of presses—Models H-400, H-300, and H-260 in our Cleveland factory, to show you exactly how Van Dorns will perform on your jobs. Without obligation, send us your mold for an actual free demonstration of the results you can obtain in your plant.

PACKAGE SERVICE

If desired, Van Dorn will assist in procuring a well designed mold from a competent moldmaker for your parts. Then Van Dorn will check the operation of the finished mold in our factory. There is no charge for this unique service.

Write for Detailed Information on Van Dorn Presses.

Van Dorn

THE VAN DORN IRON WORKS CO. • 2685 EAST 79TH STREET • CLEVELAND 4, OHIO

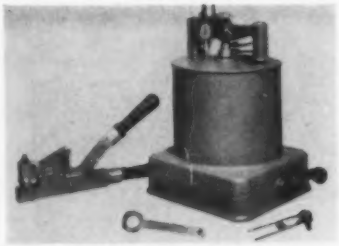
NEW MACHINERY

(From page 48)

with daylight of 48 in. between 24 in. sq. platens. Working pressure is variable up to 30 tons and opening load is 20 tons. Mold mounting plates and heating platens are extras as are timing circuits and other optional equipment. *T. H. & J. Daniels, Ltd., Lightpill Iron Works, Stroud, Gloucestershire, England.*

Plasticity tester

The Wallace Rapid Plastimeter employs the modified parallel plate compression principle to determine plasticity. A specimen is compressed between circular anvils. Maintained at a uniform temperature of 100° C. The compressive force is 10 kg. and is applied for a period of 15 sec., immediately after a "conditioning" period of 10 sec., during which the specimen is brought to a uniform temperature and thickness. Final thickness of the specimen in 0.01 mm. is the measurement of plasticity. Instrument uses steam for heating and a reducing valve enables the instrument to operate on any clean 80 p.s.i. steam main. A special valve is available for pressures up to 100 p.s.i. and an electric steam boiler can also be supplied if no steam main is near. Three sizes of upper anvil are available: 7.3 mm., 10 mm., and 14 mm. diameter which permit the instrument to operate satisfactorily over a wide plasticity range. The instrument is normally supplied with two anvils. *Testing Machines, Inc., 72 Jericho Turnpike, Mineola, N. Y.*



TESTING MACHINES Plastimeter works on parallel plate compression principle. Specimen cutter is at left.

Extruder

2½ in. extruder has four heating zones with a total heater voltage of 3000 w. per zone. Cooling is accomplished by four air blowers, one for each zone. Temperature controls range from 200 to 600° F. The barrel of the extruder is steel with a centrifugally cast Xalloy liner. The screw is chrome plated and has drilled circulating passage. L/D ratio is 22 to 1 and the effective screw length is 54½ inches. A right angle gear set with 15/1 ratio develops 31 h.p., in AGMA Class 1, with a 900 r.p.m. input. Housing is cast iron. Nominal capacity up to 200 lb./hr. is specified. *Stewart Bolling & Co., Inc., 3190 E. 65 St., Cleveland 27, Ohio.*

Epoxy resin mixer

The Auto-Rez-Mixer will proportion, meter, mix, and dispense multicomponent reactive resins. Short potlife mixes can be handled with ease and safety. Pushbutton operation automates the handling of epoxy resin systems for potting, embedment, encapsulation, impregnation, casting, and adhesive applications. Adjustable measured shots are dispensed on signal. Built-in Dispenser-Valve provides sharp cut-off of highly viscous or filled resins. Heating, agitation, deaeration, and dispensing under vacuum are available. *C. P. M. Special Machinery Corp., 324 Butler St., Brooklyn 17, N. Y.*

Spray coater

Mark III mobile flame-sprayer can be used to deposit coatings of PE or nylon up to 3/16 in. thick on metal surfaces. The **(To page 52)**

PRODEX HENSCHEL MIXERS

DIFFICULT MIXING AND DISPERSION PROBLEMS ARE SOLVED WITH THE PRODEX HENSCHEL MIXER

The PRODEX-HENSCHEL MIXER, successfully used in many installations here and abroad, performs intensive dryblending and thorough dispersion of colors, pigments, fillers, stabilizers and/or plasticizers with plastics powders or granules.

It permits, if desired, the mechanical (frictional) heat-up of plastics powders faster and more uniformly than by conduction or radiation.

The unique principle of fluidizing dry powders so that they can be mixed like liquids, plus controlled shearing action, result in mixing quality and speeds heretofore not obtained.

ARRANGE FOR A DEMONSTRATION

Investigate how it can increase the efficiency of your process.

Write for illustrated bulletin M-1.

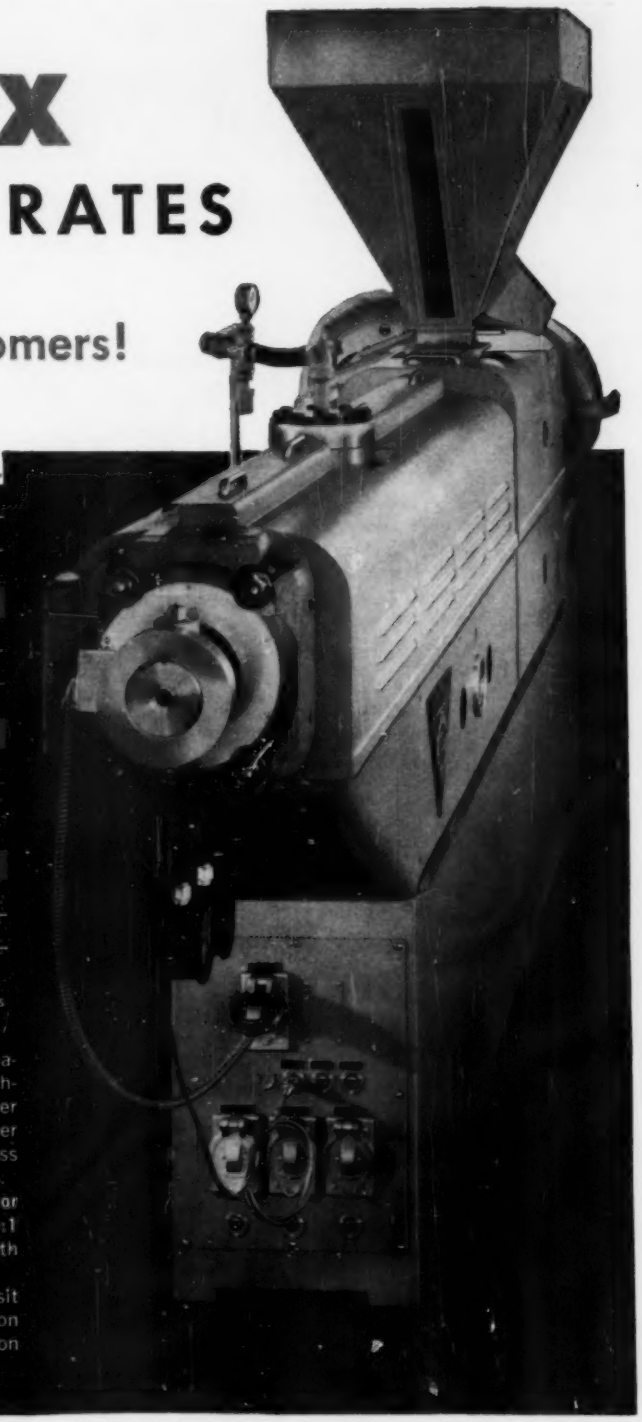
PRODEX CORPORATION • FORDS, NEW JERSEY • Phone: HILLCREST 2-2800

PRODEX
PRODUCTION RATES

...as reported by customers!

1¼" (10 H.P.)	lbs/hr.
Vinyl tubing from dryblend	120
Linear Polyethylene monofilament	100
Polyethylene blown bottles	110
2½" (20 H.P.)	
ABS Sheet, vented	200
Rigid vinyl pipe from dryblend	170
Polyethylene on cellophane	170
3½" (40 H.P.)	
Vinyl garden hose	480
Polyethylene pipe	380
Roll cast polypropylene film	370
4½" (60 H.P.)	
High impact polystyrene sheet, vented	670
Cellulose butyrate sheet, vented	640
Vinyl coated on wire	690

Proportionately high output rates are obtained on our 6" and 8" extruders.



PRODEX EXTRUDERS and EXTRUSION SYSTEMS feature the most advanced developments in extrusion technology. They make profitable operations possible under the most competitive conditions. Higher outputs, faster start-ups, better uniformity, closer tolerances and less maintenance requirements are production proven facts.

PRODEX EXTRUDERS are available either vented or non-vented with valving, and with L/D ratios of 20:1 —24:1 and longer. All deliver higher screw speeds with higher horsepower efficiency.

If you're planning the purchase of new equipment, visit our Technical Service Center. Here we'll demonstrate on extruders of various sizes and capacities how production rates such as those shown above are achieved.

WRITE FOR ILLUSTRATED BULLETIN E-6

PRODEX CORPORATION

FORDS, NEW JERSEY • Phone HILLCREST 2-2800

IN CANADA: Barnett J. Danson & Associates, Ltd., 1912 Avenue Road, Toronto 12

PRODEX —in design and performance ALWAYS A YEAR AHEAD

(From page 50)

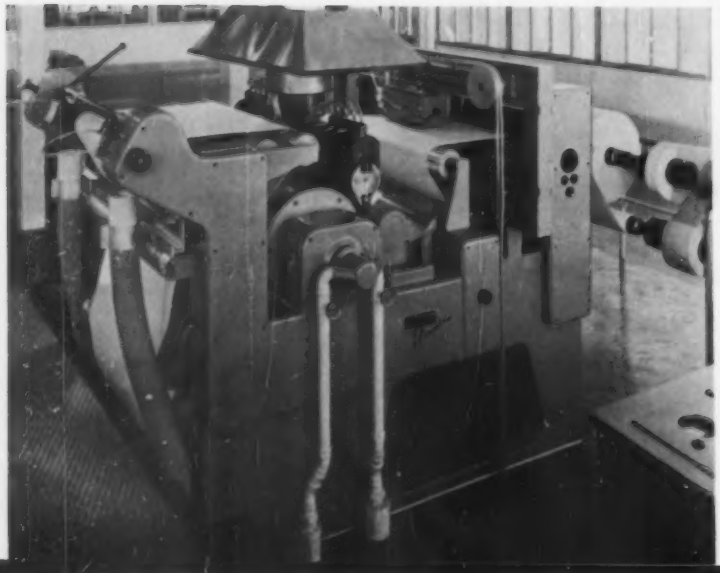
unit utilizes finely divided, modified resin powders from a powder fluidizing chamber, which requires an external source of compressed gas, as a feed. The sprayer comes complete with fitted air and power feed hoses. A source of acetylene is also required to produce the spray gun flame and melt the powdered resin spray. Cost: $485. *American Agile Corp., 5461 Dunham Rd., Maple Heights, Ohio.*

Coating plant

The PL 100 extrusion coating plant consists of complete equipment for laminating plastics films to various substrata. Included are extruder, unwind machine, thickness gages, preheat roll for the carrier feed, pressure and chill rolls, stock roll for laminating, trimmers, pull rolls, and wind up machine. An unusual feature is the vertical extruder with its drive and feed hopper mounted on a mobile platform which rides on overhead beams. The 270-lb. capacity hopper is fed electrically by means of a transfer bin and an audible signal is emitted when the material in the hopper falls below 22 lb. The extruder barrel has five heating zones; heating is also provided in the die adaptor. The die is constructed with one adjustable lip and the heaters are so located that the die may be disassembled and cleaned without the necessity of removing the heater elements. Webs of approximately 16 to 40 in. can be handled.

A hood is provided above the extrusion die to remove hot vapors formed during operation. The overhead mounting of the extruder provides easy access to the die and roll train. Unwind and coating operation proper are mounted on a platform above the general floor level of a building. Also located on the raised platform is a control table and cabinet which contains all the necessary control, measuring, and indicating devices. As the substrate is coated and trimmed, it passes over rolls and through a thickness gage to the wind up unit that is usually located below the raised platform on the general factory floor level.

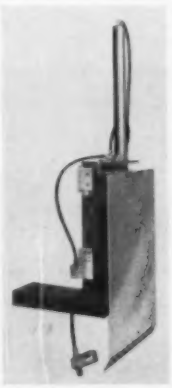
Coating speeds depend on the job. Provisions are made for measuring the thickness of the substrates prior to coating and the coated material and the differential is used to control the thickness of the coating. The machine can, likewise, be adjusted for either shear or squeeze cutting of the edge trim. *Oerlikon Plastics Limited, Stans/Northwest, Switzerland.*



OERLIKON LAMINATING PLANT. Left photo shows the vertically mounted extruder suspended from ceiling tracks which allow it to be pushed aside for easy access to machinery and equipment seen in lower photo, which includes unwind, thickness gage, coating rolls, and trimmers.

Mold wiper

For use with automatic or semi-automatic injection molds, this device uses an aluminum wiper blade which passes between the faces of the mold during the ejection part of the cycle to positively eject molded parts. The blade is custom slotted for clearance of the knock-out pins and rigidly mounted to prevent its shifting position and damaging pins. Provisions are made to prevent the mold from closing on the wiper. Blade action is air operated and requires a 40 to 100 p.s.i air supply. The stroke of the blade is adjustable from 6 to a maximum of 24 inches. The device is normally mounted on the stationary mold half or platen and can usually be adapted for use with any injection machine now in the field. Cost of the device is approximately $250. *Bermer Tool & Die, Inc., Southbridge, Mass.*



Mixer

Tumbler-type batch mixers for the blending and dry coloring of dry, free flowing plastic materials can be supplied in sizes to handle quantities ranging from a few pounds in laboratory models to over 16 tons in giant production models. Materials to be mixed are charged into the lower compartment of the mixer. By the action of a series of interior channel separators, low speed rotation of the drum divides pyramids, and blends ingredients twice each revolution. At the end of five revolutions, the unit produces a perfect mix. There is no tendency toward unmixing, regardless of the length of the mixing time. *Daffin Mfg. Co., Lancaster, Pa.*

Casting rolls

Model WSF-51 casting roll unit for plastic sheet and film consists of double-shell, chrome plated rolls, available in 12-in., 14-in. and larger diameters. Each roll is ground to a tolerance of 0.0002 **(To page 166)**

An improved stannous catalyst that holds its activity longer...

M&T CATALYST T-9

- This is a new, superior stannous catalyst with more uniform activity than stannous octoate – and greatly improved stability through storage and use!
- M&T CATALYST T-9 replaces stannous octoate to give superior performance without "premium" or extra cost.
- Field tests have shown that highly-stable CATALYST T-9 gives

MORE UNIFORM FOAM PERFORMANCE,
and therefore,
MORE ECONOMICAL FOAM PRODUCTION!

Send for a descriptive bulletin – or let a sample or trial shipment of M&T CATALYST T-9 prove the performance difference in your urethane foams.

OTHER M&T FOAM CATALYSTS:

STANNOUS OCTOATE

M&T CATALYST T-12
(dibutyltin dilaurate)

M&T CATALYST T-8
(dibutyltin di-2-ethylhexoate)

OTHER M&T PRODUCTS FOR PLASTICS:

THERMOLITE® Organotin Vinyl Stabilizers

THERMOLITE® Ba-Cd and Auxiliary Stabilizers

THERMOGUARD® Flame Retarders

®TM

Sn Sb P | organometallics
Si Ti Zr | and inorganics

M&T Chemicals

METAL & THERMIT CORPORATION
General Offices: Rahway, New Jersey

Dept. P

WORLD-WIDE PLASTICS DIGEST

Abstracts from the world's literature relative to plastics. For complete articles, send requests direct to publishers. List of addresses is at end of this section.

General

In polypropylene patent showdown, who holds high cards? Chem. Week *85*, 22-23 (Nov. 7, 1959). The foreign countries as regards patent holders on polypropylene is discussed and presented in tabular form.

Radiation processing. E. J. Henley and H. W. Chandler. Ind. Eng. Chem. *51*, 1395-1402 (Nov. 1959). The literature on radiation processing is reviewed. 64 references on polymers in a total of 391 references.

Adhesives' growth rate renewed. Chem. Eng. News *37*, 34 (Sept. 28, 1959). The use of synthetic resin adhesives is expected to expand by 80 million lb. in 1959 over the 1958 sales of 385 million pounds. Phenolic resins are expected to show the largest increase in amount of resin used in the industry.

Coming soon: Microporous plastics. Chem. Eng. News *37*, 42-44 (Sept. 7, 1959). Waterproof plastics sheets that can breathe are made by mixing the resin with starch and the mixture is then extruded into sheeting. The sheeting is cooked at 212° F. in water and then leached, washed, and dried. Nylon, polypropylene, styrene, and acrylonitrile, as well as chlorotrifluoroethylene plastics have been formed into microporous sheets in this manner.

Plastics. R. B. Seymour. Ind. Eng. Chem. *51*, 1204-12 (Sept. 1959). The literature on plastics for the past year is reviewed and summarized. 246 references.

Materials

For epoxies—a unique modifier. H. D. Barnstorff, H. D. Cummings, J. A. Cannon, and A. Y. Coran. SPE J. *15*, 873-74 (Oct. 1959). The use of triphenyl phosphite as an epoxy resin modifier is discussed. This material is shown to improve physical properties and to accelerate cure. The phosphite reacts with the resin, and becomes an integral part of the polymer molecule by crosslinking through the process of a transesterification reaction.

Epoxy resins from fats. I. Epoxidized glycerides cured with phthalic anhydride. L. L. Gelb, W. C. Ault, W. E. Palm, L. P. Witnauer, and W. S. Port. J. Am. Oil Chemists' Soc. *36*, 283-86 (1959). Phthalic anhydride and several epoxidized fatty glycerides, such as neats-foot oil, soybean oil, lard oil, etc., were used to make epoxy resins. Modulus of elasticity, tensile strength, and heat-distortion temperature were shown to increase as a function of the unsaturation of glyceride that is used to make the epoxy intermediate.

Molding and fabricating

Mathematical considerations underlying the design of wide-slit and tubular dies. Kunststoffe *49*, 463-67 (Sept. 1959). Mathematical principles still do not guarantee absolute accuracy, they do avoid mistakes when applied to actual practice. Details of the mathematical deductions and the calculation of pressure and flow distribution are given.

Barrel finishing plastics parts. C. Kramer. Plastics World *17*, 22-23, 26 (Nov. 1959). The finishing of plastics parts by tumbling techniques is reviewed and discussed.

Polypropylene as a mold material for resin casting. A. R. Faiero and R. Clark. Brit. Plastics *32*, 430 (Sept. 1959). Polypropylene (PP) molds are used in the embedment of electronic components in epoxy and polyester resins. Isotactic PP gives dimensional tolerances similar to those obtained with metal molds, but without the need for release agents. Less crystalline polypropylene produces flexible molds. Among the major advantages of these molds are their excellent release properties; the ability to sustain curing temperatures up to 150° C.; a service life exceeding that of polyvinyl chloride and silicone rubber molds; as well as the economics derived from in-plant injection molding by hand-operated machinery.

Applications

Thermoplastic pipes and fittings in the dyeing and finishing industry. D. C. B. Chandler. Corrosion Tech. *6*, 184 (June 1959). Styrene-butadiene-acrylonitrile plastic pipe installations have been proven extremely valuable for the textile industry. This material is sufficiently resistant to be used in both cold and hot water piping systems for scouring and dyeing processes. The major advantage in the use of plastic pipe is the elimination of a major source of rust contamination.

Chemical-resistant flooring based on epoxy resins. H. R. Touchin. Corrosion Tech. *6*, 227-28 (Aug. 1959). New developments in the compounding of epoxy resins for use in flooring are discussed. Emphasis is given to formulations required for chemical-resistance flooring. Methods of applying epoxy flooring are presented and its advantages given.

Adhesives for flooring. Adhesives Age *2*, 28-30 (Aug. 1959). The factors involved in the installation of flooring materials with adhesives are presented and discussed.

Weather-resistant polyvinyl alcohol coatings. K. F. Plitt. Paint and Varnish Production *49*, 27-29, 104-05 (Aug. 1959). Weather-resistant polyvinyl alcohol coatings having high resistance to toxic organic solvents are described. These coatings depend upon the development of acetals to provide the necessary water resistance when applied. The coatings are well suited to application by conventional painting techniques. In physical and application properties they compare favorably with commercial paint coatings.

Conveyor belt laboratory tests and their relation to field investigation group trial results. D. Bulgin. Plastics Inst. Trans. & J. *27*, 117-25 (Aug. 1959). Laboratory tests for conveyor belts and their relation to performance in service are considered.

Preservation and storage of sound recordings. A. G. Pickett and M. M. Lemcoe. Library of Congress publication, available for 45¢ from Superintendent of Documents, Washington 25, D. C., 74 pp. 1959. The storage deterioration of sound recordings was studied to establish optimum storage conditions. The plastics considered include cellulose nitrate, shellac, polyvinyl chloride, and polyesters in disk and tape forms. The significant mechanisms of degradation of each type of recording are discussed and recommendations for storage environments and techniques are presented. The limited experience relating to the aging of plastics **(To page 56)**

"Improvement in Insulation Resistance"

...one of the key reasons why Formica Corporation uses

RCI PLYOPHEN PHENOLIC RESINS

In printed circuits, as in many other products, Formica® laminated plastics have set high standards. In maintaining these standards Formica engineers depend on the superior quality and uniformity of Reichhold phenolic resins.

For example, Mr. J. C. Pitzer, manager of Industrial Process Engineering for Formica, has this to say, "Reichhold PLYOPHEN 5896 allows us to offer the highest available insulation resistance in our XXXP-36 paper base laminate."

PLYOPHEN excels in all these important characteristics:

1. essential cold punching properties **2.** exceptional insulation resistance **3.** low water absorption **4.** high impact strength **5.** resistance to corrosion **6.** ease of machining **7.** excellent performance under high soldering temperatures.

If you manufacture industrial laminates, keep in mind the fact that Reichhold's PLYOPHEN line also includes phenolics developed specifically for producing general purpose laminates, rolled tubing, alkali resistant laminates and hot punching stock . . . as well as special varnishes for a variety of other applications.

Creative Chemistry ...Your Partner in Progress

REICHHOLD

REICHHOLD CHEMICALS, INC., RCI BUILDING, WHITE PLAINS, N.Y.

Synthetic Resins • Chemical Colors • Industrial Adhesives • Phenol • Hydrochloric Acid • Formaldehyde • Phthalic Anhydride • Maleic Anhydride
Ortho-Phenylphenol • Sodium Sulfite • Pentaerythritol • Pentachlorophenol • Sodium Pentachlorophenate • Sulfuric Acid • Methanol

PLASTICS DIGEST

(From page 54)

and sound records under normal storage conditions preclude accurate estimates of potential shelf life, but the investigation demonstrates that further study would provide means of predicting incipient failure in order to permit re-recording before loss of the records. The life span of a plastic article in an ideal environment is a property that is built into the article when it is manufactured. Proper care cannot extend this potential life although it can prevent premature failure. Presently used sound recording materials are designed for use and economy and not for storage.

How the new propellants affect plastics and elastomers. R. E. Mowers. Materials in Design Eng. *50*, 89-91 (Sept. 1959). The effects of new storable missile propellants on the properties of plastics and elastomers were studied. Hydrazine and unsaturated dimethyl hydrazine did not essentially affect chlorotrifluorothylene, tetrafluoroethylene, fluorinated ethylene propylene, high-density polyethylene, and nylon during a 2-mo. exposure. However, chlorotrifluoroethylene developed radial cracks around the circumference of lip seals that were in actual service in valves in hydrazine fuels. These failures were attributed to stress crazing of the material. Relieving the parts of stress prior to machining to final dimensions may avoid the stress-crazing problem. Tetrafluoroethylene and fluorinated ethylene propylene were the only two plastics that were found suitable for prolonged use in the oxidizer, nitrogen tetroxide.

Properties

Failure mechanisms in glass-fiber-reinforced plastics. M. B. Desai and F. J. McGarry. ASTM Bull. No. 239, 76-79 (July 1959). In glass-fiber-reinforced plastic laminates, internal cracking under tensile stressing takes place because of yarn crimp resulting from fabric weave and because of resin tensile and shear brittleness. This effect is recognized and measured by water absorption determinations carried out subsequent to tensile loading cycles. It does not occur under compressive loading. The cracking can be prevented by the use of nocrimp fabrics, if loaded in a principal direction, or through the use of more ductile resins. The technique of observation naturally provides a valuable tool in which to study the three-dimensional and interlaminar characteristics of such composite structures.

Effect of stress concentrations on laminate strength. E. L. Strauss. Plastics Tech. *5*, 35-39 (Aug. 1959). Stress concentrations in reinforced plastic laminates can produce failures at exceeding low stress levels. For example, a 4-in.-wide specimen containing a 1-in.-diameter hole failed in tension at 21,700 p.s.i., whereas the normal tensile strength of the material was 40,700 p.s.i. The loss in strength was most pronounced for tensile loading and was less critical in flexure. The strengths of specimens containing holes decreased with increasing hole diameter. In a group of specimens containing the same diameter hole, strengths increased with increasing hole diameter—specimen width ratio. Specimens containing multiple holes failed at lower stress levels than an equivalent specimen containing a single hole. Countersunk holes were approximately 5% weaker than corresponding drilled holes. Semicircular notches and holes of equal radii produced similar stress concentration effects. Strength reductions obtained by varying the fillet size from the standard 3-in. radius used in tensile specimens to a ¼-in. radius were approximately 10 percent.

Halogens and inorganic groups in high polymers. E. Dumont. Kunststoff-Rundschau *6*, 173-75 (1959). The effect of various inorganic groups on the properties of polymers are evaluated briefly. Polymers discussed include Thiokol, neoprene, silicones, chlorinated rubber, and fluorine-, boron-, and phosphorus-containing polymers. The chlorinated and particularly the fluorinated polymers improve heat resistance; the iodine and bromine substitutes offer no practical value.

Producing special properties in plastics with fillers. J. Formo and R. Isleifson. SPE J. *15*, 627-29 (Aug. 1959). Some improved properties of epoxy resins obtained by the use of fillers are described. Some disadvantages of unfilled epoxies used in potting and encapsulation resins, such as high exothermic temperatures, shrinkage, and thermal expansion, may be overcome by selection of the proper quantity of filler. Thermal conductivity, arc resistance, and viscosity are usually increased by addition of fillers. In general, the amount rather than the type of filler seems to have the greater effect on these properties.

Testing

An apparatus for quantitative gas-absorption measurements. J. R. Shelton and E. T. McDonel. J. Applied Polymer Sci. *1*, 336-39 (May-June 1959). An apparatus for quantitative gas-absorption measurements is described and illustrated with drawings and photographs. It has been used to study the oxygen absorption of rubber, polyethylene, epoxide coatings, and drying oils, as well as polyurethanes.

Identification of acrylate and methacrylate polymers by gas chromatography. E. A. Radell and H. C. Strutz. Anal. Chem. *31*, 1890-91 (Nov. 1959). Each acrylate and methacrylate polymer, singly and in mixtures, will produce a unique chromatogram when pyrolyzed. By heating a sample in a closed system in an inert gas and feeding the pyrolyzate directly into a gas chromatograph, it is possible to identify the original monomers. A sample size of approximately 5 mg. or less is used and the time required for a single analysis is 15 to 45 minutes. By repeating the analysis on two columns with different retention characteristics, qualitative identification of the fraction may be made. Cursory examination of other polymers indicates that this procedure may be applicable to a wide range of polymers and copolymers.

Chemistry

Stereoregular polymers. II Polymerization of alkenyltrimethylsilanes with Ziegler catalyst. S. Murahashi, S. Nozagura, and M. Sumi. Bull Chem. Soc. Japan *32*, 670-74 (July 1959). Vinyl-, allyl-, and 3-butenyl-trimethylsilane were polymerized at 70° C. in n-heptane with a heterogeneous Ziegler catalyst. The amorphous and crystalline polymers were separated by extraction. The solubility, density, melting point, and x-ray spectra of the crystalline polymers were described. The glassy transition temperatures of the amorphous polymers were also determined.

Vulcanization of butyl rubber with phenol-formaldehyde derivatives. P. O. Tawney, J. R. Little, and P. Viohl. Ind. Eng. Chem. *51*, 937-38 (Aug. 1959). Butyl rubber vulcanized with phenol-formaldehyde derivatives is extremely stable in the presence of heat or **(To page 168)**

HERE'S Lightfast Color FOR PLASTICS THAT LIVE OUTDOORS*

Du Pont Monastral® Blue BT-380-D and Monastral® Green GT-710-D

Your vinyl and polyethylene products will *keep* their bright, crisp colors despite heat, sunlight and weathering when pigmented with Du Pont "Monastral" Blue BT-380-D and "Monastral" Green GT-710-D.

These brilliant pigments and others in the "Monastral" family of blues, greens, and reds also offer outstanding resistance to chemicals, bleed, crocking and migration. Another advantage is their ease of dispersion.

For complete details about these quality pigments, contact your Du Pont Pigments Representative, or write: E. I. du Pont de Nemours & Co. (Inc.), Pigments Department, Wilmington 98, Delaware.

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

DU PONT

REG. U. S. PAT. OFF.

**Outdoors is home to vinyl garden hose, beach ball, water toy, polyethylene sand bucket, styrene radio case—and a host of other plastic products.*

U.S. PLASTICS PATENTS

Copies of these patents are available from the U. S. Patent Office, Washington, D. C., at 25¢ each.

U. S. Pats., Sept. 15, 1959

Solid state polymerization. E. J. Lawton and W. T. Grubb, Jr. (to General Electric). 2,904,481.

Epoxide resin-trifluorochloroolefin composition. F. J. Honn (to Minnesota Mining). 2,904,528.

Curing agents for epoxy resins. R. Steckler and G. Robinson (to General Aniline). 2,904,530.

Curing polyepoxides. P. Bruin and H. A. Oosterhof (to Shell). 2,904,531.

Diisocyanate lacquer. H. Wilms, O. Bayer, and W. Bunge (to Mobay). 2,904,532.

Unsaturated polyesters. E. F. Carlson and G. B. Johnson (to California Research). 2,904,533.

Manufacture of polyesters. J. L. R. Williams and K. R. Dunham (to Eastman Kodak). 2,904,534.

Curing polyurethanes. T. F. Mika (to Shell). 2,904,535.

Cyanoacetamidophthalic esters of polymers. D. A. Smith and C. C. Unruh (to Eastman Kodak). 2,904,-539.

Continuous polymerization. G. R. Barrett (to Monsanto). 2,904,541.

Olefin polymerization. E. U. Fasce and N. L. Cull (to Esso). 2,904,542.

U. S. Pats., Sept. 22, 1959

Polymerization catalysts. A. W. Anderson, J. M. Bruce Jr., N. G. Merckling, and W. L. Truett (to Du Pont). 2,905,645.

Olefin polymerization. G. Natta, G. Mazzanati, and P. Longi (to Montecatini). 2,905,646.

Oxetane polymers. R. F. Goddu (to Hercules). 2,905,647.

Vinylidene resin. R. J. Reid, W. M. Smith Jr. and B. H. Werner (to Firestone). 2,905,651.

Polyurethane rubbers. C. E. Best, W. R. Hausch, and J. J. Robertson (to Firestone). 2,905,652.

Graft copolymers. R. A. Hayes (to Firestone). 2,905,653.

Isopropyl benzene-acryolein styrene terpolymer. E. C. Chapin and R. I. Longley Jr. (to Monsanto). 2,905,656.

Modified polyethylene-terephthalates. W. A. H. Huffman (to Chemstrand). 2,905,657.

Copolymerization of chlorotrifluoroethylene and an alkyl vinyl ether. J. J. Robertson (to Firestone). 2,-905,660.

Olefin polymers. H. Muehlbauer and H. Weber (to Badische Anilin). 2,-905,661.

U. S. Pats., Sept. 29, 1959

Irradiated polyethylene. E. J. Lawton and A. M. Bueche (to General Electric). 2,906,678-9.

Ion-exchange. N. W. Frisch and A. F. Preuss Jr. (to Rohm & Haas). 2,-906,714.

Sulfonamides of organic polymers. W. Hagge, M. Ruaedvlieg, and H. Seifert (to Bayer). 2,906,715.

Anion-exchange. J. C. H. Hwa (to Rohm & Haas). 2,906,716.

Polyisocyanate, lignin, rubber composition. G. S. Mills and H. E. Hayo Jr. (to U. S. Rubber). 2,906,718.

Chloroethylene polymers. E. M. Jankowiak and A. R. Nelson (to Dow). 2,906,719.

Polyepoxide composition. W. C. Simpson (to Shell). 2,906,720.

Epoxy resin composition. J. Reese (to Chemische Werke Albert). 2,-906,723.

Polymethylol melamine composition. J. H. Daniel Jr. (to American Cyanamid). 2,906,724.

Polymer compositions. J. R. Briggs and R. L. Zapp (to Esso). 2,906,725.

Chloroethylene polymer. D. A. Gordon (to Dow). 2,906,727.

Vinyl aromatic polymers. W. K. Schweitzer Jr. (to Dow). 2,906,728.

Polytrifluorochloroethylene composition. F. J. Honn (to Minnesota Mining). 2,906,730.

Super-linear polyamides. J. C. F. Kessler (to American Enka). 2,906,-732.

Stabilization of polyethylene. W. H. Rader and H. L. Wilson (to National Petrochemicals). 2,906,733.

Polymers of acylated vinylhydroquinones. H. G. Cassidy (to Research). 2,906,736.

Terephthalate polyesters. O. York Jr. (to Hercules). 2,906,737.

Curing tetrahydrofuran polymers. E. J. Goldberg (to Du Pont). 2,906,-738.

Ethylene polymerization. L. M. Thomka (to Dow). 2,906,742.

Halogen-containing polyolefins. E. Heitzer, A. G. M. Gumboldt, G. Messwarb, and G. Bier (to Lucius & Bruning). 2,906,743.

Methylol resin derivatives. D. R. Levering (to Hercules). 2,906,745.

U. S. Pats., Oct. 6, 1959

Polyurethanes. S. O. Greenlee (to S. C. Johnson). 2,907,718-9-23-4-5-6-7-8-9-30-1-2-3-4-5-6-7-8-9-40-1.

Acrylic composition. D. S. Staicopoulos (to Du Pont). 2,907,722.

Perfluorocarbon polymers. H. Frey and R. Huth (to Lucius & Bruning). 2,907,742.

Resins. S. O. Greenlee (to S. C. Johnson). 2,907,743-4-5-6-7-9-50.

Curing epoxy resins. D. J. Lieb (to Borden). 2,907,748.

Alkenylphenol - aldehyde resins. R. M. Christenson and H. E. Holste (to Pittsburgh Plate). 2,907,751.

Polyisocyanates. F. B. Smith (to U. S. Rubber). 2,907,752.

Polymethylene terephthalate. D. Maclean, N. Standring, P. V. Youle, and N. Munro (to Imperial Chemical). 2,907,753.

Polyamides. F. Howlett, K. Butler, and J. A. Low (to British Nylon). 2,907,754.

Polymerization of lactams. H. Lautenschlager, H. Friedrich, W. Schmidt, and K. Dachs (to Badische Anilin). 2,907,755.

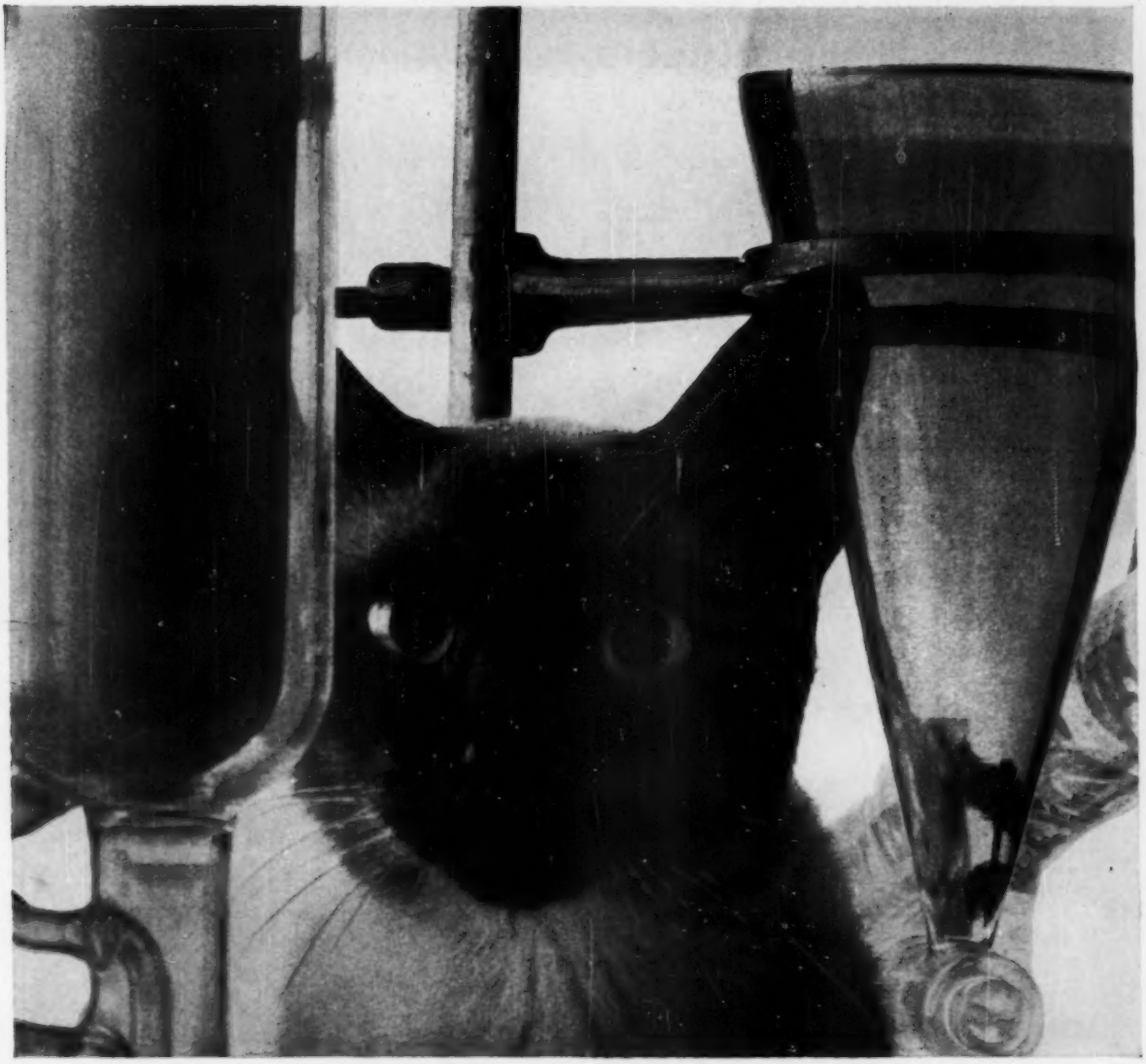
Styrene polymerization. K. W. Doak (to Koppers). 2,907,756.

Ethylene polymerization. N. G. Merckling (to Du Pont). 2,907,757.

U. S. Pats., Oct. 13, 1959

Polyepoxide composition. W. J. Belanger (to Devoe & Raynolds). 2,-908,660.

Polymerization. W. C. Calvert (to Borg-Warner). 2,908,661.—**End**



ARGUS LOOKS BEFORE YOU LEAP!

No need to take chances. *Argus has the answers* that will spare you costly mistakes.

Day after day, Argus researches, tests, evaluates countless vinyl compounds to bring you stabilizers and plasticizers that make your products perform as you want them to.

The solution to *special* vinyl problems and better and more economical solutions to *standard* problems (heat and light stability, sulphide staining, outdoor weatherability, and others) are constant goals of Argus research.

Largest producer of vinyl stabilizers and plasticizers in the world, Argus has the specialized facilities and personnel needed for such intensive, creative research. Argus has pioneered the field, and its Mark stabilizers and Drapex plasticizers are steadily setting new standards for the industry.

You will find that it pays to get *all* the answers *before* volume production. Call or write to Argus for consultation, technical bulletins, samples.

ARGUS CHEMICAL CORPORATION / New York and Cleveland

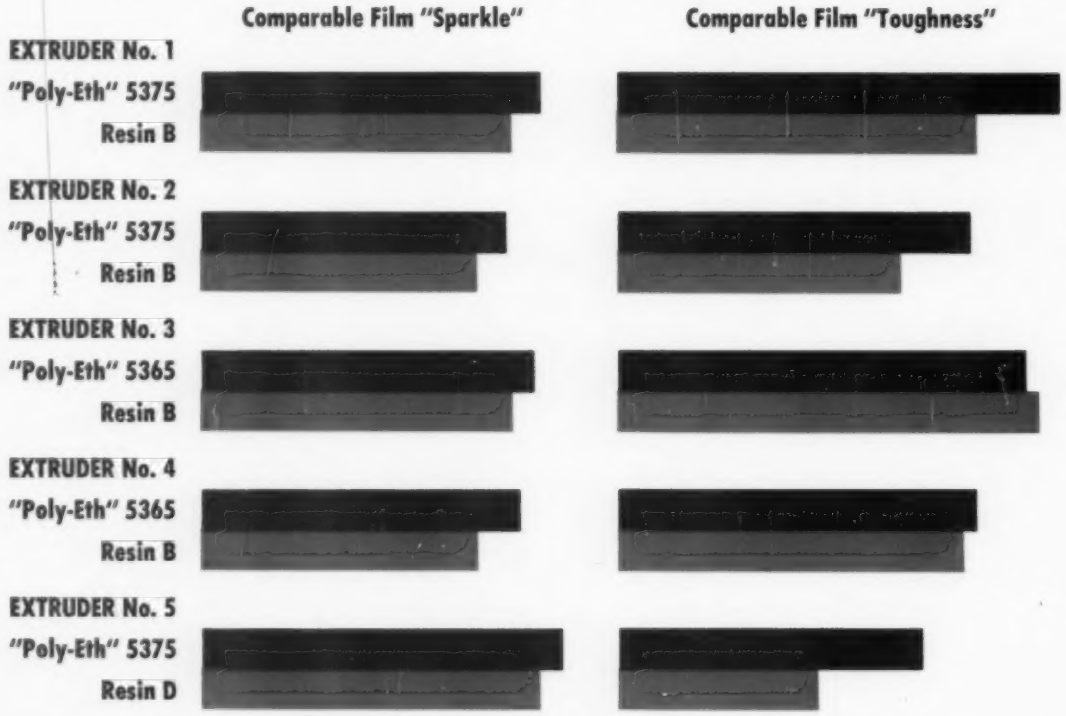
Main Office: 633 Court Street, Brooklyn 31, N.Y. Branch: Frederick Building, Cleveland 15, Ohio

Rep's.: H. M. Royal, Inc., 11911 Woodruff Ave., Downey, California; Philipp Bros. Chemicals, Inc., 10 High St., Boston; H. L. Blachford, Ltd., 977 Aqueduct St., Montreal. European Affiliates: SA Argus Chemical NV; 33, Rue d'Anderlecht, Drogenbos, Belgium—Lankro Chemicals, Ltd.; Salters Lane, Eccles, Manchester, England.

Advanced resin technology developed by Spencer

New Polymorphous Packaging Film With

Tests of Actual Production-Run Film Show How "Poly-Eth" 5300 Compares In Toughness and Sparkle:



It's easy to see that film made of Spencer's new polymorphous resins has a definite advantage over competitive materials. These charts were developed from film run by five different commercial extruders. Differences in values for the same resin result from variations in equipment and operating techniques. For complete information on these and other tests, contact your Spencer Representative.

SPENCER **Poly-Eth** **Polyethylene**

SPENCER CHEMICAL COMPANY, DWIGHT BLDG., KANSAS CITY, MISSOURI

Chemical Company now makes possible . . .

Polyethylene For Toughness & Sparkle

Here's how "Poly-Eth" 5300 Series resins give you an exclusive balance of film properties for greater product protection and eye-catching sales appeal:

Packaging experts have long searched for a general purpose polyethylene film that contained *both* of these important properties: (1) the toughness necessary for rough handling and for long shelf life; and (2) the sparkling appearance needed to attract the customer and close the sale.

But now at last . . . toughness *and* sparkle have been combined in a single polyethylene film. This new and different kind of film is made possible by Spencer Chemical Company's development of "Poly-Eth" 5300 series resins. These resins are the result of a breakthrough in resin technology which produces what is called a "polymorphous" polyethylene resin.

Because they are polymorphous, these resins produce films with an unusually high degree of impact strength and tear resistance. Gloss is tops. Haze is held to a minimum. And yet this film is truly *tough*. At the same time, "Poly-Eth" 5300 series resins offer a complete balance of all other properties necessary in a general purpose packaging film.

Before being released for broad-scale film production, these polymorphous resins underwent an extensive series of field tests in commercial extrusion plants under a wide variety of processing conditions. In these tests, films made of "Poly-Eth" 5300 series resins were compared with films made of leading competitive resins. In nine out of ten cases, the "Poly-Eth" films were found to be definitely superior (see chart at left).

You are invited to compare a sample of this new film with your present film. For a roll of 1¼-mil flat film (50' long x 11" wide), contact your Spencer Sales Representative, or mail coupon with your business letterhead. There's no obligation, of course!

This drop test is just one of a variety of tests used to compare the properties of "Poly-Eth" 5300 with leading competitive resins.

SEEING IS BELIEVING:
For free sample of film, attach coupon to your business letterhead and mail today!

Mr. Fred C. Sutro, Jr., Polyethylene Product Manager
Spencer Chemical Company
Dwight Building, Kansas City 5, Missouri

Please send me a free 50' sample roll of 1¼-mil film made from your new "Poly-Eth" 5300 polymorphous resin. I understand this places me under no obligation.

NAME_____

TITLE_____

COMPANY_____

ADDRESS_____

CITY_____ STATE_____

DAKE laboratory presses...

for short-run requirements

General Features:

Hydraulic pumping unit completely enclosed in base.

All-steel welded construction. Maximum rigidity for accurate work.

Bronze bushing in piston guide. Reduces wear on precision-machined parts.

Rapid advance and pressing regulated manually by air pressure.

Electric-heated platens with indicating thermostat in each platen. Thermostat range from 100 F to 650 F.

•

Dake air-operated, hydraulic laboratory presses are especially designed for laboratory testing and experimentation, and small parts production. They are low in cost, compact in design, and simple to operate. Like other Dake presses, these presses are engineered by men experienced in every phase of the plastic industry, who can help you meet special needs and requirements for every plastic molding operation. Laboratory presses are available in capacities from 25 tons to 75 tons; other presses, in capacities from 25 tons to 600 tons. Write for Bulletin No. 374.

25-Ton Dake laboratory press used to mold experimental resins in a Grand Rapids, Michigan, varnish company.

DAKE CORPORATION
648 Robbins Road, Grand Haven, Mich.

masters in the field of

COLOR

JASPER VASE BY WEDGWOOD

Josiah Wedgwood (1730-1795), perhaps the greatest of English potters, created ware that is still used and duplicated today. The descendants of this master craftsman continue to operate the famous Wedgwood factory . . . frequently utilizing old Josiah's original molds.

At Westchester thermoplastic colors are formulated by craftsmen of long experience . . . who work with strict chemical and physical controls. Every Westchester color is scientifically tested for desirable temperature and flow characteristics and resistance to degrading and migrating. Westchester color concentrates and pre-mixed color blends are regarded as the criteria of quality for the thermoplastics industry. When you see Westchester stamped on your containers of resin, you know that *you are using the custom color you specified.*

Write now for detailed information on any color problem involving linear and conventional polyethylenes, polypropylenes, and other thermoplastics.

APPROVED FOR FOOD, DRUG AND COSMETIC PACKAGING

A new series of FDA certified WESTCHESTER colors is now available. These colors are supplied with a registration number, attesting FDA approval of the pigments.

*WESTCHESTER PLASTICS, Inc.

326 WAVERLY AVENUE, MAMARONECK, N. Y. • OWens 8-7410

Custom Compounders of Polyethylene Molding Powder and other Thermoplastic Materials

Manufacturer and Developers of Unicolor and Formacolor *Pliothene, Formacolor, Unicolor® T.M. Reg. U.S. Pat. Off.

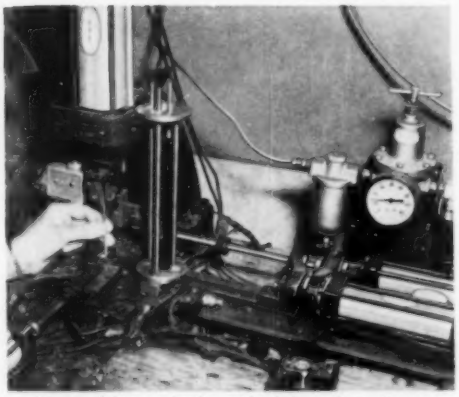
with the

BELLOWS AIR MOTOR®

After a Bellows Air Motor was installed to feed hard grade fibre to this saw, production jumped 50%, rejects dropped, operator fatigue vanished, blade life increased.

...you can build special machines ...or modernize existing machines *at low cost and quickly!*

With parts normally available in every tool room, plus one or more Bellows Air Motors, and a little creative ingenuity, you can "spot modernize" scores of operations whose high cost whittles away at profits. The few illustrated here are typical of hundreds we can show you. The chances are good that no matter what you make, nor how you make it, this versatile air cylinder, with its *built-in* electrically controlled valve, can lend a mighty important helping hand to your cost reduction program.



Assembling tin-handled brushes into molded plastic caps is speeded and simplified with this shop-built machine powered by Bellows Air Motors.

THESE BROCHURES MAY LEAD TO IMPORTANT SAVINGS IN YOUR PLANT

You're almost certain to get at least one new cost-cutting idea from these brochures. Bulletin BM-25 describes fully the Bellows Air Motor, illustrates and tells about many actual installations. "Spot-A-Mation Idea" File gives you diagrams, complete information and equipment lists which will enable your own men to automate scores of operations, quickly and inexpensively.

For your free copies, write: Dept. MP-260, The Bellows Co., Akron 9, Ohio.

676C-3

Built around three interlocked Bellows Air Motors, this special machine for milling and drilling a linen base Bakelite part tripled production.

The Bellows Co.

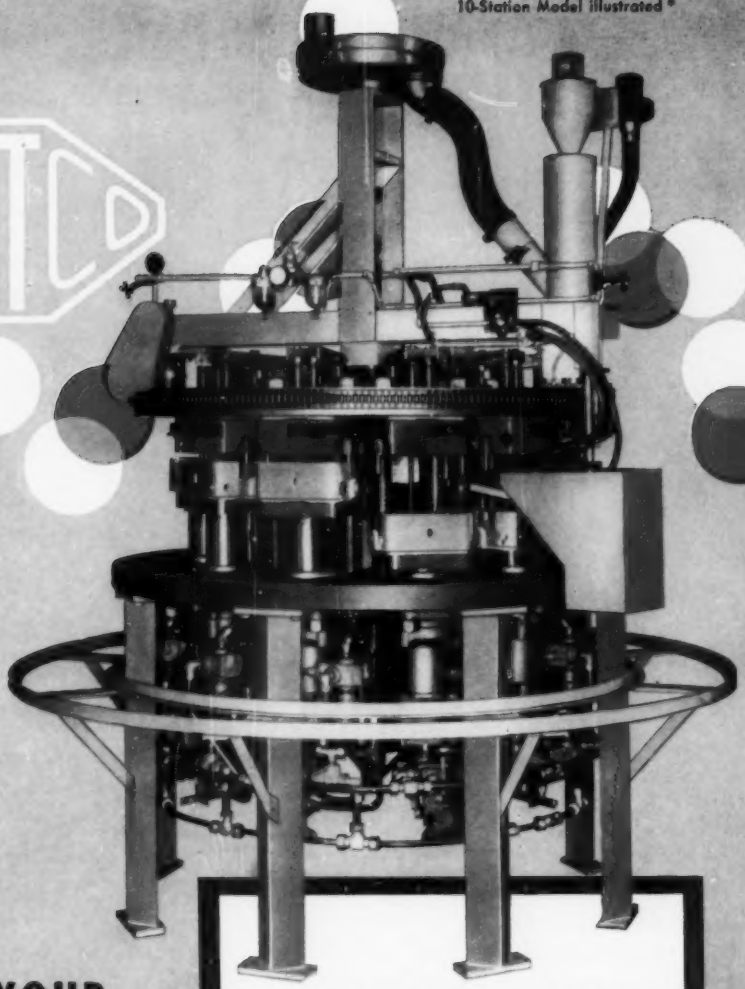
DIVISION OF INTERNATIONAL BASIC ECONOMY CORPORATION (IBEC)

AKRON 9, OHIO

OTHER INDUSTRIAL DIVISIONS OF IBEC: Sinclair-Collins Valve Co., Valvair, Akron, Ohio • V. D. Anderson Co., Cleveland, Ohio

NE-BUTTCO

10-Station Model Illustrated *



AUTOMATE YOUR PLASTIC MOLDING OPERATIONS WITH NEBUTTCO ROTARY PRESSES

BIG-PROFIT FEATURES:

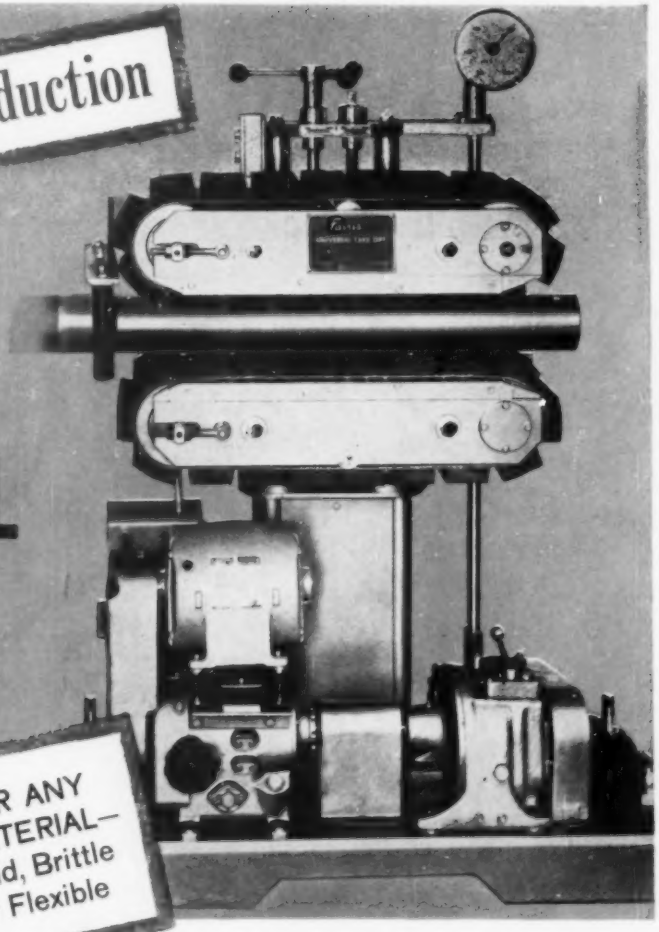
Inexpensive molds, for thermosetting compounds
Can use up to 20* different molds, one press
Molds can be changed while press is operating
Simple ejection of parts
Hopper-fed — rotating supply
Adjustable production cycle
Adjustable temperature in mold holders
Low cost molding of large or small quantities
Presses can be furnished for many applications
For descriptive bulletin or demonstration of machines in operation, contact

NEW ENGLAND BUTT CO.
Division of Wanskuck Co.
304 Pearl Street • Providence 7, R. I.

Press is also made in 30-station model.

now in volume production

the versatile Farris UNIVERSAL TAKE-OFF



FOR ANY EXTRUDED TUBE OR PROFILE

FOR ANY MATERIAL— Rigid, Brittle or Flexible

- **Hauls all profiles, tubes, cables without set-up**
- **Will not scratch, mar, mark or dull any finish**
- **Infinitely variable speed ranges from 4" to 445 ft/min.**
- **Instantly adjustable to any center line of extrusion and to any size extrusion up to 16"**
- **No slippage – highest safety factor of hauling power**

Plastic, rubber or metal . . . from the first foot out of your extruder to the last . . . the versatile Farris Universal Take-Off Machine hauls perfectly and without waste. Endless caterpillar belts with cellular-form blocks pull with little vertical pressure, permitting take-off of even the thinnest materials without distortion. Available in a choice of hydraulic or electronic drives and a variety of models for every extruding requirement. Every machine is backed by the internationally known and accepted Farris manufacturing, sales and service organization.

HUNDREDS OF USERS SAY—

"It is the most versatile type of Take-Off for use with plastic extruders..."

"We can only say that we are highly delighted with its performance and would be very pleased to recommend it to any of your customers..."

"We haul off tubes having very thin wall thickness (0.015") without distorting or damaging the tube..."

"It is a very sound and straightforward engineering job..."

"We appreciate its great flexibility in dealing with different sections and its ease of adjustment while running..."

WRITE, WIRE OR PHONE FOR OUR CATALOG
Complete technical data about Farris Universal Take-Off Machines. Ask for Catalog FM-110.

Farris

UNIVERSAL MACHINE CORP.

MANUFACTURER OF MACHINES FOR THE PLASTIC, METAL AND RUBBER INDUSTRIES

400 Commercial Avenue, Palisades Park, N. J.

IN TEXAS: 5405 Clinton Dr., Houston, 20. IN EUROPE: Universal Machinery & Services Ltd., Leeds, England

MANUFACTURING AFFILIATES:
Farris Engineering Corp.
Farris Flexible Valve Corp.
Farris Pickering Governor Co., Inc.
Farris Combustion Controls Corp.

Moplen

POLYPROPYLENE

from

MONTECATINI

milestone in the conquest of inner space

Everywhere chemists are exploring the way molecules are put together... putting atoms together in exact, predetermined relationships with each other... producing spatially-ordered molecules ... making useful products from these polymeric materials with designed-in properties for specific applications.

Leader in this conquest of inner space is Montecatini, who developed the first stereospecific polymer, MOPLEN® polypropylene. The forerunner of a revolutionary class of plastic materials discovered by Giulio Natta of the Polytechnic Institute of Milan, MOPLEN® is being widely used in Europe and in the United States.

Montecatini continues to explore this new world of structural chemistry ... is developing new polymerization catalysts and producing new polymers with exciting potential as plastics, textile fibers and elastomers in the products of tomorrow.

Wherever you are in the world, you can put these discoveries to work for you. Look to Montecatini for MOPLEN® ... and for new advances in the conquest of inner space.

Montecatini Trademark

MONTECATINI

SOC. GEN., MILANO, ITALY

U. S. and Canada Representative: CHEMORE CORPORATION • Two Broadway, New York 4, N.Y. • BO 9-5080

How reinforced plastics molders and high pressure laminators save time, work, material, money with **Phenopregs***

1. Phenopreg prepregs simplify molding operations. Only one material—containing both resin and reinforcement—is used. This eliminates the need for weighing, mixing and hand-applying the compounds. Also the need for resin-reinforcement ratio control.

2. Phenopregs reduce hand labor. Elimination of hand dispersion of resin is one means. Use of custom-slit, sheeted and die-cut Phenopregs is another. And, where simple shapes are to be molded, roll material can frequently be fed right into the dies, for still a third saving of labor.

3. Phenopregs make mass production possible. By eliminating the lengthy process of hand impregnation, and, in the case of hand layups, by eliminating slow production cycles due to long periods for curing, Phenopregs speed up output, improve delivery schedules.

4. Phenopregs mean cleaner molding operations. They eliminate the need for cleaning up after wet molding, saving time, labor.

5. Phenopregs reduce waste. This is because there is no spillage and no mold overflow.

6. Phenopregs cut storage and handling costs. Because only one material has to be stored and handled, Phenopregs greatly reduce costs for these items.

7. Phenopregs produce better products. Phenopregs are superior because they enable the molder to (a) keep a uniform resin-reinforcement ratio throughout his laminate; (b) exercise strict control over the resin content; (c) control the cure because of the even dispersion of curing agents; (d) avoid defect-producing trapped air pockets or tiny air bubbles; and (e) eliminate the harmful effects of moisture . . . since the Phenopregs come predried.

8. Phenopregs build business. Phenopregs open new marketing opportunities by creating improved products—products more desirable because their physical, chemical, mechanical and electrical properties are always consistent.

Fabricon—First in Plastic Impregnating Materials for...

Decorative Laminates Fabricon offers you the broadest line of clear and tinted overlay papers, contemporary and classical patterns, wood grains, solid colors, core stock sheets and balancing papers ever manufactured by any single source.

Impregnated Glass Cloth Applications Fabricon offers you phenolic, epoxy, silicone and polyester impreganted grades suitable not only for present applications, but for great new potential uses.

Electrical and Mechanical Applications. Fabricon offers you a full line of phenolic impregnated papers that meet or exceed NEMA and Military Specifications.

High and Low Pressure Molding Fabricon offers you a broad choice of phenolic impregnated fabrics, from heavy canvas duck to fine, lightweight cotton sheeting. All materials meet or exceed NEMA and Military Specifications.

New and Specialized Applications Fabricon offers you its combined experience, manpower and research facilities to help develop new materials for your specialized requirements.

For specific details, write, outlining your application

*Registered Fabricon prepreg trademark

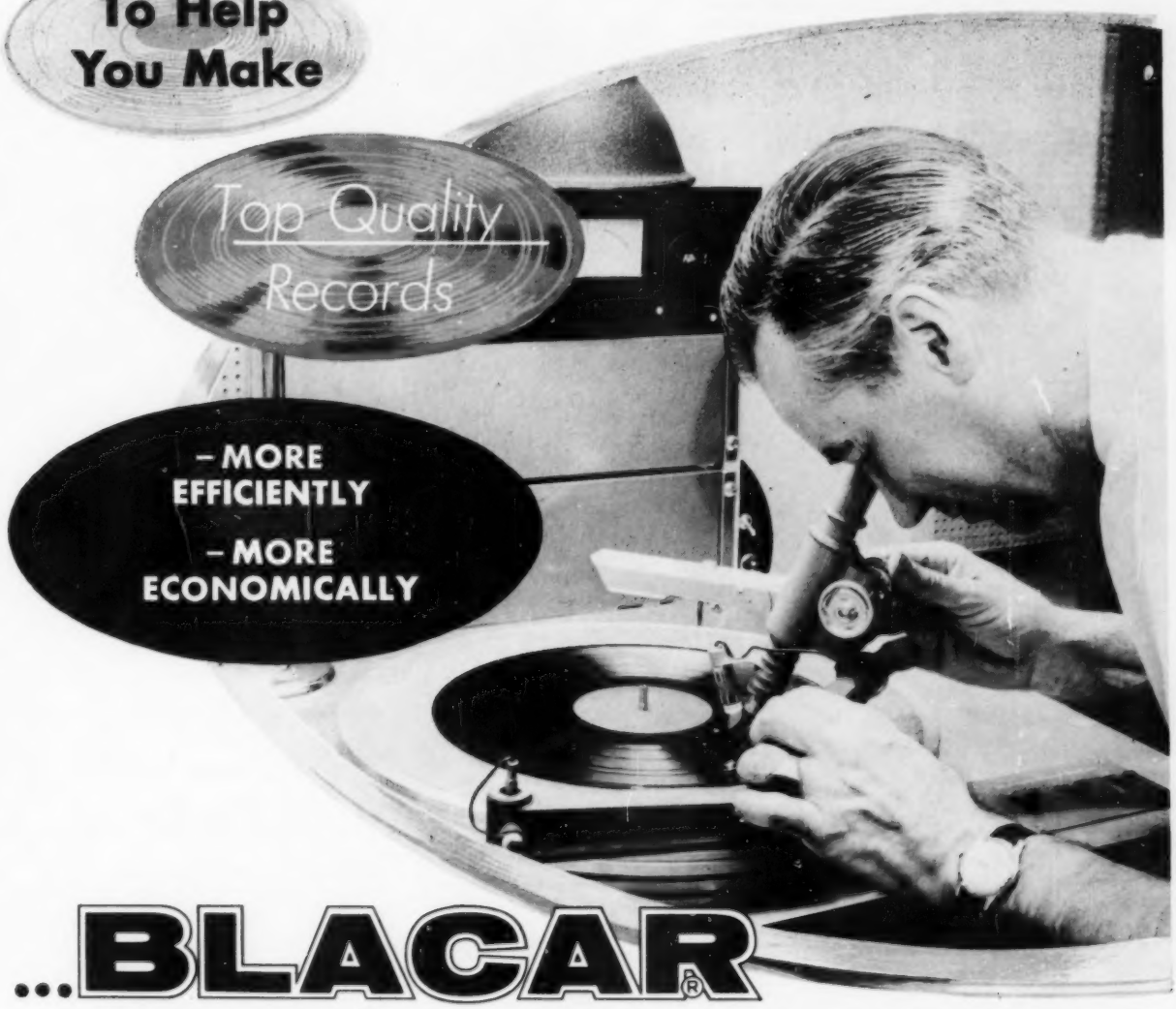
FABRICON FP **FABRICON PRODUCTS**

A Division of the EAGLE PICHER *Company*

1721 W. Pleasant Ave. • River Rouge 18, Mich.

To Help You Make

Top Quality Records



– MORE EFFICIENTLY
– MORE ECONOMICALLY

...BLACAR®

PVC RESINS & COPOLYMERS (PVC-VA)

Blacar resins are your assurance of top quality performance in both binaural and monaural recordings. They offer better retention of high fidelity tonal characteristics through longer record life, elimination of needle noise and static. Economies and efficiency in production are assured through minimized rejects by curtailing blistering, non-fills, staining, etc.

BLACAR 385 (PVC-VA) COPOLYMER and BLACAR 150 (low molecular weight) PVC Resin provide these exceptional features:

- Excellent Wetting characteristics
- High Heat Stability
- Maximum Uniformity of Flow.

For that extra quality factor—use BLACAR PVC Resins and Copolymers to ensure exceptional reproduction of mold sound tracks with the added benefits of superior flexural strength and abrasion resistance.

For Technical Assistance, Working Samples and Data,

***Write to* CARY CHEMICALS, INC.**
P. O. BOX 1128, New Brunswick, New Jersey

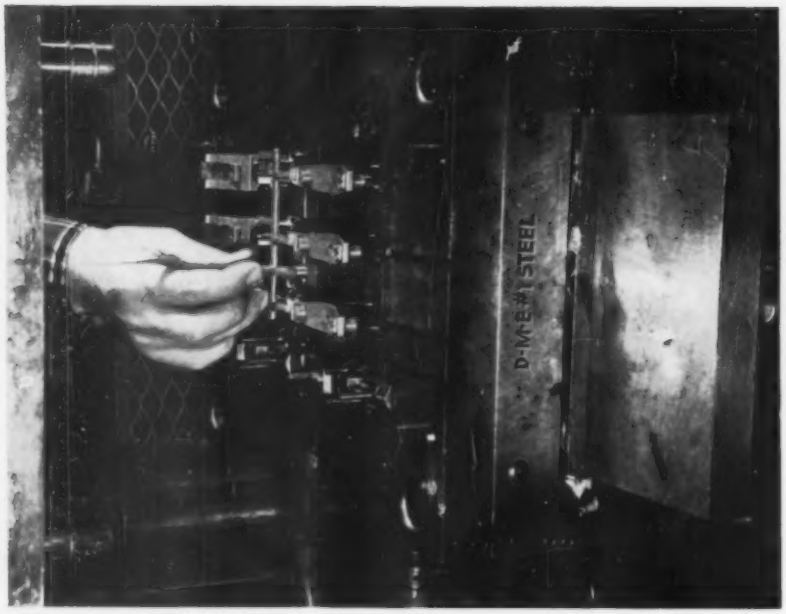
CARY CHEMICALS INC.

Plants at East Brunswick, N. J., Flemington, N. J., and Woodside, L. I., N. Y.

VINYL RESINS — VINYL COPOLYMERS — VINYL COMPOUNDS — SPECIALTY WAXES — HIGH MELTING POINT SYNTHETIC WAXES

DME Mold Standards

DEDICATED TO QUALITY, SERVICE AND ECONOMY IN MOLDING



YOU SAVE MORE ON MOLD COSTS WITH OVER 6,000 D-M-E STANDARD MOLD BASES TO CHOOSE FROM

Largest Selection Saves You Time and Money

Whether it's a one-cavity "test" mold or a 60-cavity high production run, chances are D-M-E has the right size Standard Mold Base to fit the job and the molding machine.

D-M-E's 32 standard sizes, up to 23¾" x 35½", with 100 standard cavity plate combinations for each size, give you the largest selection of carbon or alloy steel standards available from any single source.

Save on Design Time, Moldmaking Time, Replacement Parts and Delivery

Design time is reduced by using D-M-E's full-scale Master Layouts and Catalog of specifications and prices. Moldmaking time is reduced because all D-M-E plates are precision ground flat-and-square, ready for cavity layout and machining. Exclusive interchangeability gives you the added saving of immediate replacement of any component part. And D-M-E's seven branch offices and warehouses are always fully stocked with Standard Mold Bases and components to meet your delivery requirements.

Cut Costs on Your Next Program

Start saving on your next moldmaking program, no matter how large or small. Take advantage of D-M-E Quality, Service and Economy.

THERE'S NO SECRET To a Fine Finish...

...With D-M-E's Line of Mold Polishing Supplies

Polishing mold cavities to a high lustre that is imparted to the molded piece was once "a well-guarded secret." But with D-M-E's complete line of mold polishing supplies moldmakers are able to attain the particular finish required by the part.

With D-M-E Diamond Compound, mirror finishes are produced in less time and at less cost.

Other time and money saving items for your polishing department include: D-M-E's Felt Polishing Kit, Abrasive Stones, Mold Polishing Compound, Abrasive Mounted Points and D-M-E-'s Mold Cleaner and Rust Preventive.

START SAVING NOW... Contact your nearest D-M-E Branch for full details and prices.

FASTER DELIVERIES FROM COMPLETE STOCKS

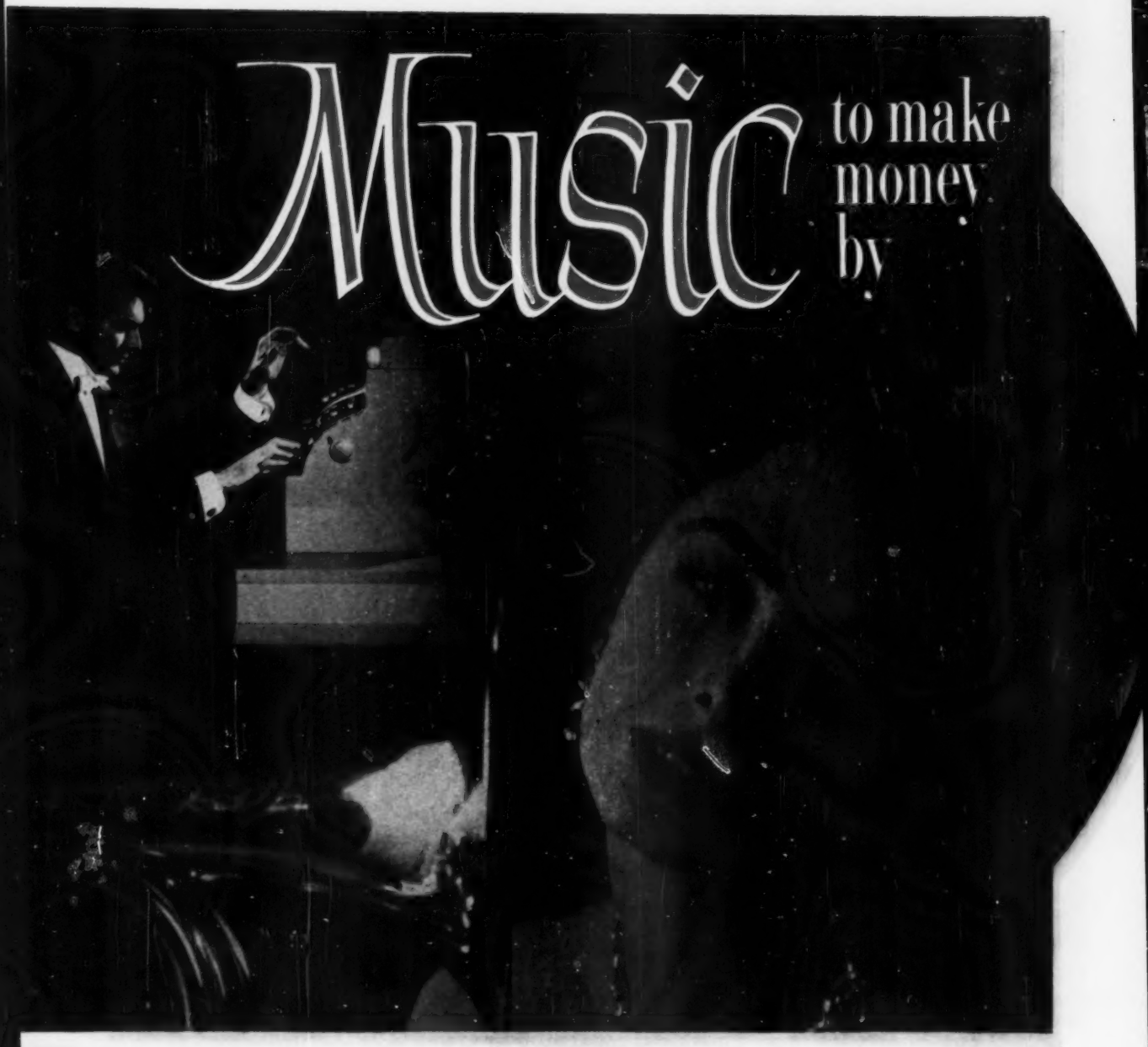
Over 1,000 D-M-E Standard Mold Bases always IN STOCK at local D-M-E Branches for IMMEDIATE DELIVERY.

DETROIT MOLD ENGINEERING COMPANY

DME

- DETROIT: 6686 E. McNichols Rd.—CHICAGO: 5901 W. Division St.
  HILLSIDE, N.J.: 1217 Central Ave.—LOS ANGELES: 3700 S. Main St.
- D-M-E CORP., CLEVELAND: 502 Brookpark Rd.—DAYTON: 558 Leo St.
- D-M-E of CANADA, Inc., TORONTO, ONT.: 156 Norseman Ave.

89-C



IN NATURAL, VIBRANT, FULL-DEPTH **STEREO**

PRESSED FROM *Borden* SUPER-QUALITY COPOLYMERS

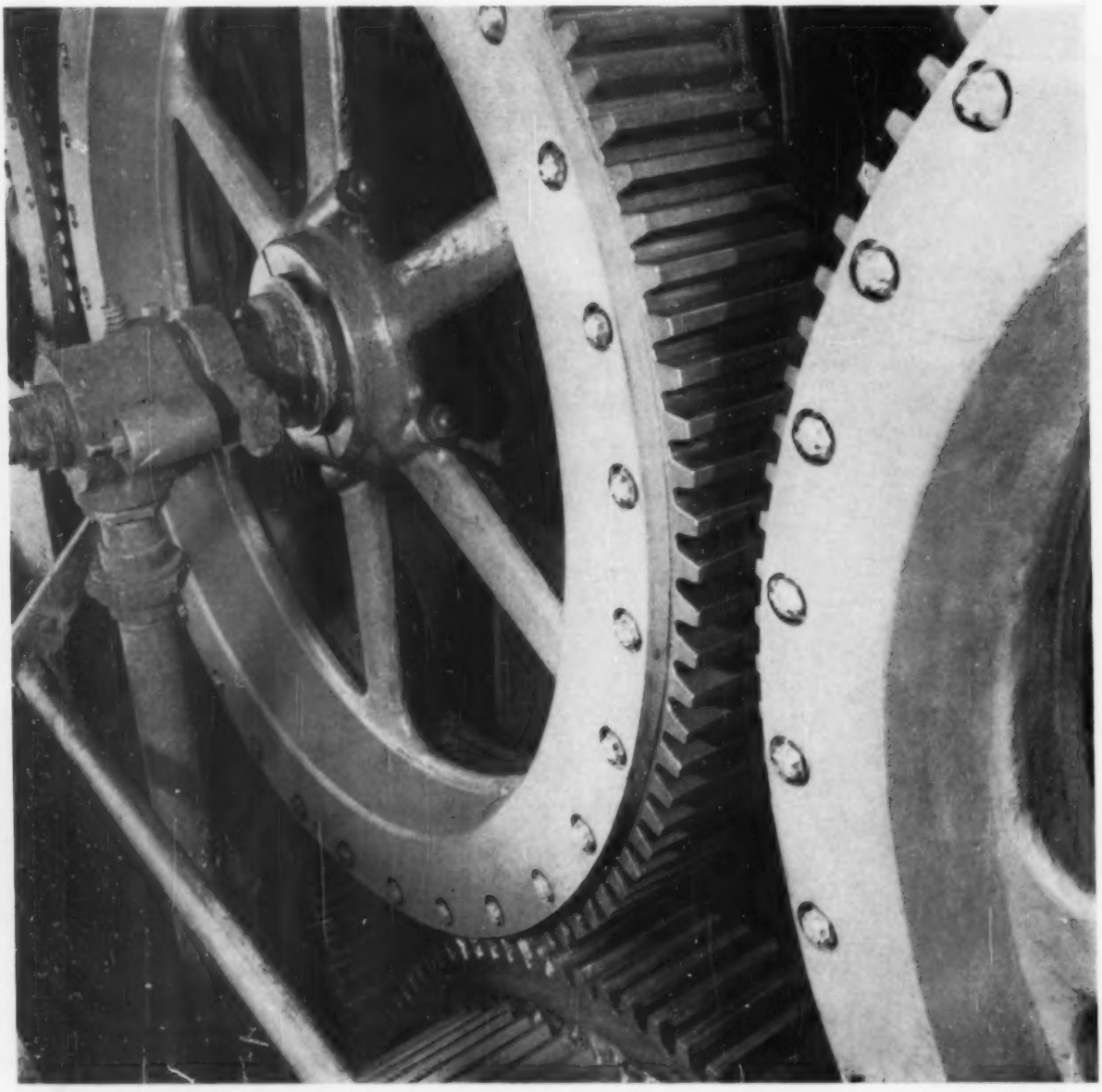
Stereo . . . music to make money by . . . and a growing market for quality pressings made at *low unit cost*. That's where Borden can help.

Borden super-quality copolymers have the batch-to-batch OPERATIONAL STABILITY you need for day in—day out peak production efficiency. Shorter mixing cycles . . . fewer "non-fills" . . . less trouble with blisters and porosity.

Day after day you get strong, abrasion-resistant, noise-free discs that faithfully reproduce the full beauty of original music . . . play after play after play.

Borden copolymers can help you cut costs and improve the quality of records, vinyl-asbestos floor tiles, or many other vinyl products. Let us show you how. The Borden Chemical Company, Polyvinyl Chloride Dept., MP-20, 60 Elm Hill Ave., Leominster, Massachusetts.

IF IT'S A *Borden* Chemical IT'S GOT TO BE GOOD!



GEARED TO THE FUTURE—These gears or gear rims used to replace cast iron dryer gears on #5 paper making machine at St. Regis Paper Company's plant at Deferiet, New York, were machined from 6" sheet stock of Panelyte grade 905. The outside diameter of the wheel is 54-7/16". The Panelyte rims have a 6" face with 112 teeth, a 1½" circular pitch on a 53-31/64" pitch diameter. These gears greatly reduce noise and machine vibrations thus improving working conditions and lowering general maintenance costs. Damaged gears are easily replaced by simply substituting a new gear ring instead of replacing the entire hub, arms and rim as was necessary with metal gears. The Panelyte is highly resistant to shock and has excellent machining characteristics. One of the important materials used in the fabrication of these Panelyte phenolic laminates is Mount Vernon Duck.

This is another example of how fabrics made by Mount Vernon Mills, Inc., and the industries they serve, are serving America. Mount Vernon engineers and its laboratory facilities are available to help you in the development of any new fabric or in the application of those already available.

UNIFORMITY Makes The Big Difference In Industrial Fabrics

Mount Vernon Mills, inc.

A LEADER IN INDUSTRIAL TEXTILES

TURNER HALSEY COMPANY
Selling Agents

Main Office and Foreign Division: 40 Worth Street, New York, N. Y.
Branch Offices: Chicago • Atlanta • Baltimore • Boston • Los Angeles

CYCOLAC®

THE BORG-WARNER PLASTIC THAT'S TOUGH, HARD, AND RIGID

For their remarkable new Floor Washer the Hoover Company designed a total of 31 plastic parts, and specified that 15 key components be made of CYCOLAC. Hoover is using this Borg-Warner ABS plastic because it is tough, hard, rigid—**and** economical. It scoffs at scuffs, stains, hot water, and detergents—takes the roughest handling—helps keep the new floor washer virtually trouble-free. Being light in weight, CYCOLAC helps make the washer easy to use, too.

Plan now to test CYCOLAC yourself. Better in more ways than any other plastic.

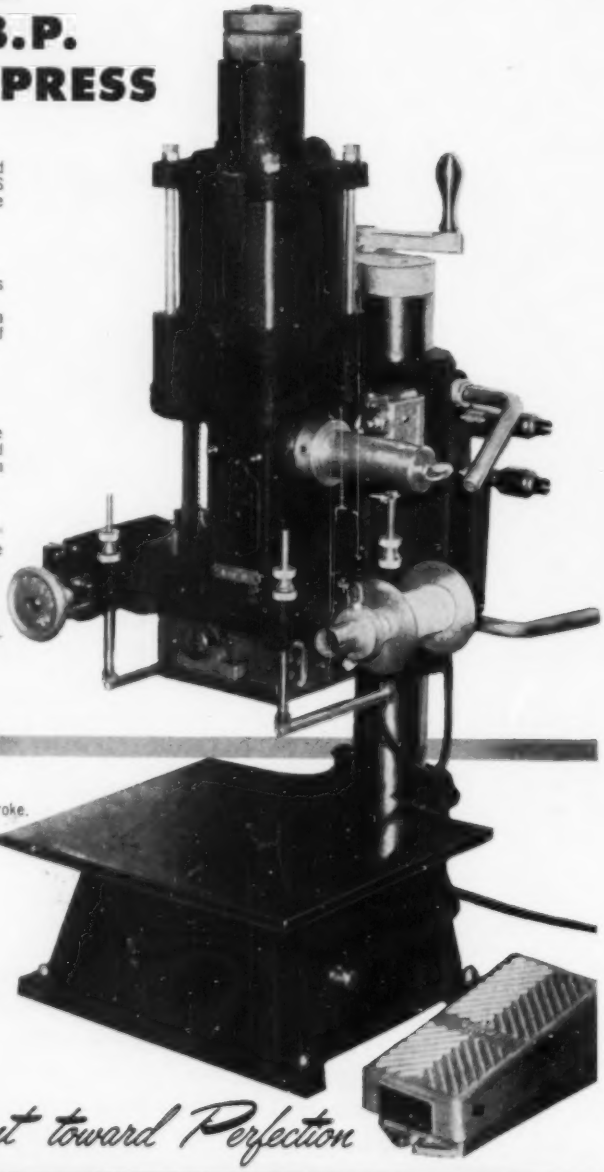
GET THE FACTS
MARBON CHEMICAL
WASHINGTON

WRITE TODAY!
DIVISION **BORG-WARNER**
WEST VIRGINIA

the new *Peerless*

STAMPING PRESS

AIR-OPERATED MODEL A.B.P. BENCH PRESS



★ **FAST OPERATOR**

for hot stamping on cloth, paper, leather, wood, fibre, soft and hard plastics, hard rubber and most other materials. PEERLESS ROLL LEAF available in gold, imitation gold, aluminum, a wide range of pigment and metallic colors.

★ **AIR OPERATED**

Press has a built in air cylinder which is cushioned at both ends of cylinder to avoid hammer blows on work.
In addition to raising and lowering screw we have included a micrometer adjustment at top of cylinder for adjustment of impression.
Press is equipped with a timing relay for dwell control.

★ **FOOT OR HAND CONTROL**

Foot control, standard equipment, leaves operator's hands free to position articles to be stamped. Also available with hand control. Speed adjustment permits up to 40 impressions a minute, depending on articles and materials being stamped.

★ **AUTOMATIC HEAT CONTROL**

Electrical outlet built into press. Pilot light, thermometer, insure uniform temperature.

★ **AUTOMATIC ROLL FEED**

Adjustable, feeds up to 5" of leaf 4¼" wide. Side to side feed.

★ **BUILT FOR PUNISHMENT**

by Peerless, pioneers in roll leaf stamping.

SPECIFICATIONS

SIZE:
15" wide x 19" deep x 36" high. Depth of throat opening 6" from center of heat. 5" maximum opening from die plate to table. 2" stroke.

STATIONARY TABLE:
12" x 11"

AIR PRESSURE:
Not less than 2 h.p. compressor — 80 lb. pressure equipped with 60 gallon tank. Compressor not supplied.
Pressure approximately 19 times line pressure.

ELECTRICAL:
110 volts A.C., unless otherwise specified.

SHIPPING WEIGHT:
220 lbs. Net, 270 lbs. Gross
Head size: 4" x 5"
Die plate size: 4" x 5"
Chase size, inside: 3" x 4"

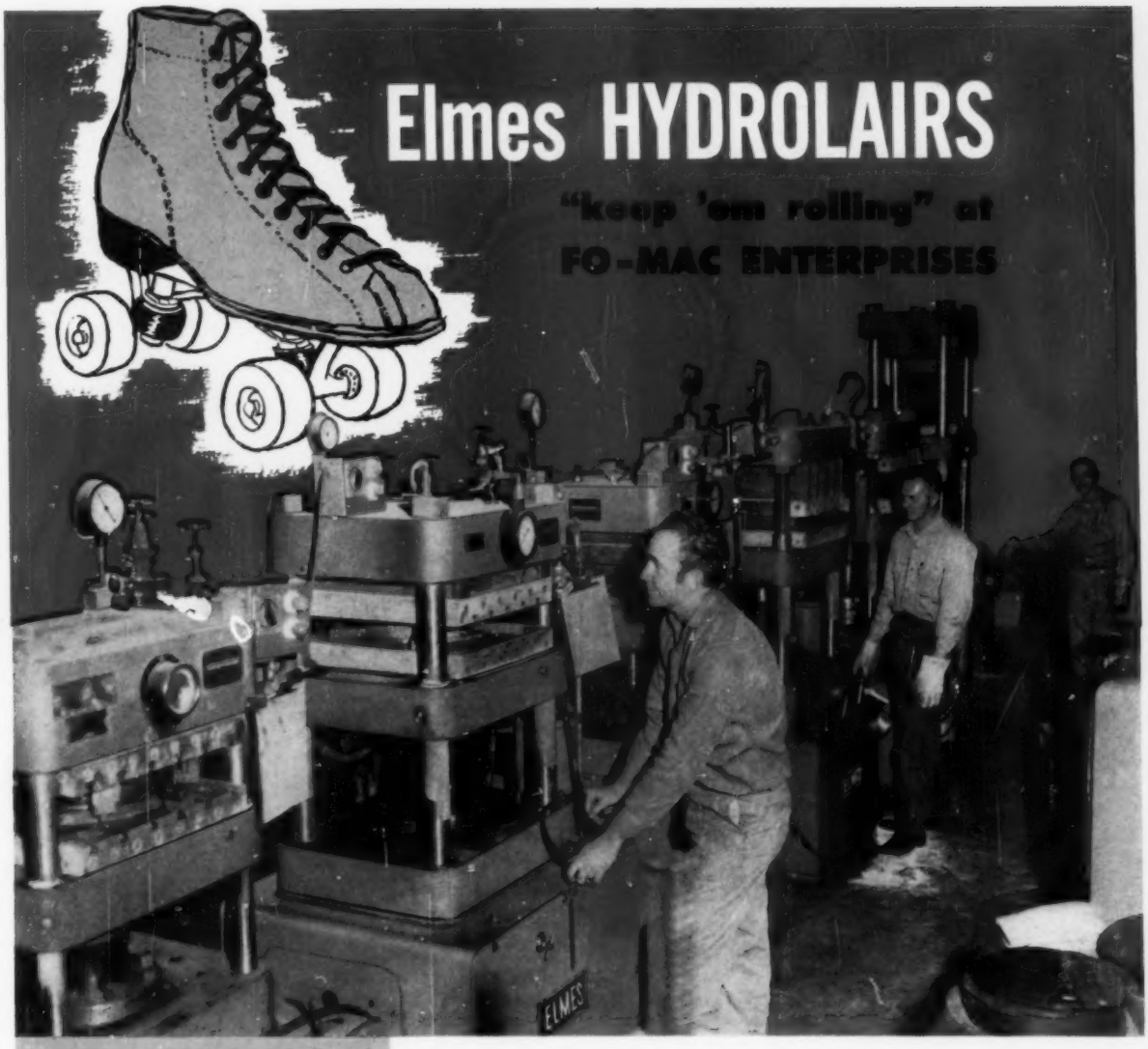
EQUIPMENT INCLUDES:
lubricator, regulator, strainer and 6 ft. of hose.

Achievement toward Perfection

PEERLESS ROLL LEAF COMPANY, INC.

4511 - 4515 New York Ave., • Union City, N. J.

BRANCH OFFICES: BOSTON • CHICAGO • *Peerless Roll Leaf Division* • GANE BROS. & LANE, INC.
REPRESENTATIVES: ST. LOUIS • LOS ANGELES • SAN FRANCISCO • LOUISVILLE • MONTREAL • LONDON, ENG.



Fo-Mac's battery of Elmes Hydrolairs handles compression molding operations on skate wheels and numerous oil industry commodities of rubber and rubber-resin compounds.

Hydrolairs are available in 30, 50, 75, and 100-ton models with hand lever control; also 50-ton model with electrical control. Get the full Hydrolair story from your Elmes Distributor, or write to us direct.

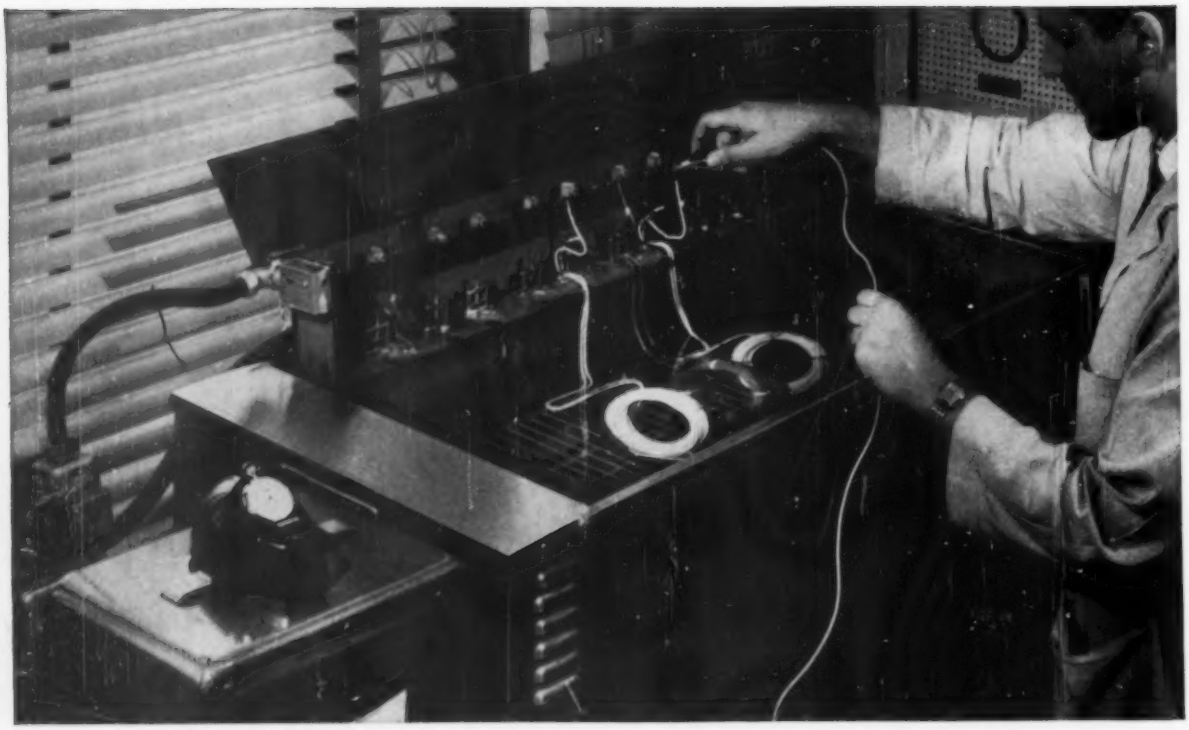
Add roller skate wheels to the long list of products manufactured economically on Elmes HYDROLAIR® presses. Fo-Mac Enterprises, Inc. of Tulsa, Oklahoma, keeps its production right on schedule—holds its costs in line—with Hydrolairs.

Vernon Fowlkes, Fo-Mac's General Manager, says: "We are satisfied with our Elmes Hydrolair presses in every way—in ease of operation, speed of production, and quality of output. As for maintenance, our cost on this equipment has been at the very minimum."

Hundreds of small-press users are taking advantage of the Hydrolair's quality performance, economy price, and *low* operating cost. The Elmes Hydrolair is an oil-hydraulic press *powered by air,* right from your shop air line. And the patented Elmes Power-Petuator® *holds full pressure during long cure cycles with NO power consumption!*

Elmes American Steel Foundries
ENGINEERING DIVISION

1159 Tennessee Avenue, Cincinnati 29, Ohio
METAL-WORKING PRESSES • PLASTICS MOLDING PRESSES • PUMPS • ACCUMULATORS



Immersion test proves DYTHAL stabilizer gives top performance to 75°C THW vinyls.

How DYTHAL® stabilizer is helping the electrical industry develop a new insulation, 75°C THW

. . . improved vinyl stocks will lift rating of building wire by 15°C

"More 'housepower' needed soon!", say architects.

And the electrical industry is getting set to oblige . . . developing *new* vinyl insulation stocks (THW) that are (1) readily extrudable, (2) pass 12-week, 75°C immersion tests with flying colors.

In compounds that meet these high standards, a National Lead Company stabilizer, DYTHAL, is proving to be an exceptional product.

Tests . . . confirmed by leading insulation producers . . . show that DYTHAL stabilizer is by far the most compatible and the most efficient stabilizer to use in stocks such as these. It confers superior heat stability. It promotes excellent extrusion properties. It does not affect sensitive plasticizers.

What's more, DYTHAL stabilizer is well adapted to an electrical compound. It disperses uniformly. It does not produce gassing or porosity. It is highly resistant to water extraction and to moisture pick-up.

Other National Lead stabilizers do as much for other vinyl stocks

DYTHAL stabilizer is only one of the National Lead Company stabilizer developments now benefiting electrical stocks. Six more (see box) are widely used. Still other National Lead Company stabilizers overcome process or service problems of other vinyl stocks.

For information on these National Lead Chemicals, for application help . . . just write.

6 other stabilizers developed by National Lead Company improve vinyl electrical insulations

- DYPHOS® stabilizer for top-notch light-and-weather-resistant jacketing, other outdoor insulations.
- LECTRO "60"® stabilizer provides economy in 60°C compounds . . . in higher-rated vinyls, blended with other stabilizers.
- TRIBASE* and TRIBASE-E* stabilizers boost heat resistance of 60°C 7, TW, SPT stocks at low cost.
- LECTRO* 77 stabilizer meets requirements for primary insulations up through 80°C types.
- LECTRO* 78 stabilizer improves special high-temperature stocks including flexibles, rigids, electrical-grade plastinols.
- DS-207® stabilizer-lubricant improves heat resistance, extrusion characteristics, water resistance of vinyl.

*Trademark

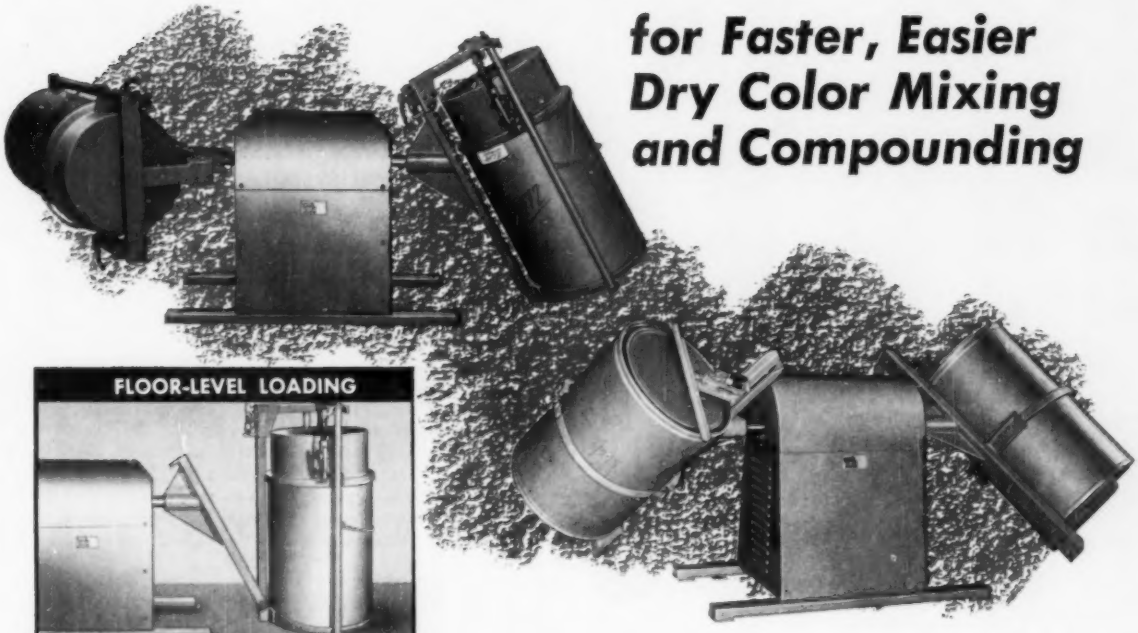
A Chemical Development of **National Lead Company**

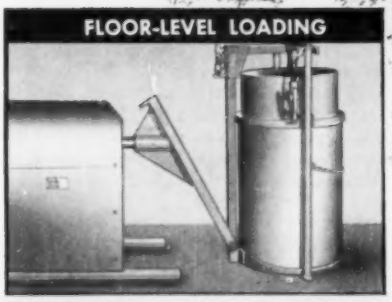
111 Broadway, New York 6, N. Y.

In Canada. CANADIAN TITANIUM PIGMENTS LIMITED, 1401 McGill College Avenue • Montreal

"U.S." *HEAVY-DUTY* DRUM TUMBLERS

for Faster, Easier Dry Color Mixing and Compounding





17-G

You can save time . . . cut costs . . . speed production by tumble mixing colorants and molding materials right in their shipping drums. "U. S." Drum Tumblers are designed to do the job quicker, easier, more effectively.

These precision-built machines have sturdy welded construction for long life and trouble-free service. Their rugged steel bases provide rigid support for handling unbalanced loads. Positive roller chain drives, extra powerful motors and heavy-duty ball bearings assure smooth tumbling action under heavy loads.

Only "U. S." Drum Tumblers offer such extra ease of operation. Custom-built to meet specific mixing requirements, they are available with typical features shown at left — "floor-level" loading for quicker, easier drum handling; built-in drum extenders, providing extra space for thorough mixing of full drum loads; quick-acting toggle clamps for rapid opening or closing in one easy motion; adjustable drum holders to handle various size drums.

"U. S." Drum Tumblers are built in a range of sizes to handle standard fiber or metal drums; with motors of ¾, 1, 2, 3, and 5 h.p.; capacities from 250 to 500 lbs. per drum. Our Engineering Service Department will gladly recommend the proper unit to meet your specific mixing requirements. Write today for complete details.

PROCESS EQUIPMENT DIVISION

U. S. STONEWARE
AKRON 9, OHIO

NEW

FWS-90

Here is a fast, preplasticizing-type machine, incorporating many design features pioneered by Watson-Stillman, plus a number of new refinements. Among its outstanding features are:

New Pumping Unit . . . Two-way variable-displacement pump requires less wiring and fewer electrical components. Directional control and decompression valves are eliminated. Result: Smooth shockless operation.

Controlled Mold-Filling Speed . . . Injection speed of initial and final fill independently adjustable.

Large Die Space . . . You can mold a greater variety of products.

Preplasticizing Unit . . . Proven design provides shorter cycles, better control of shot thickness, higher-quality molding.

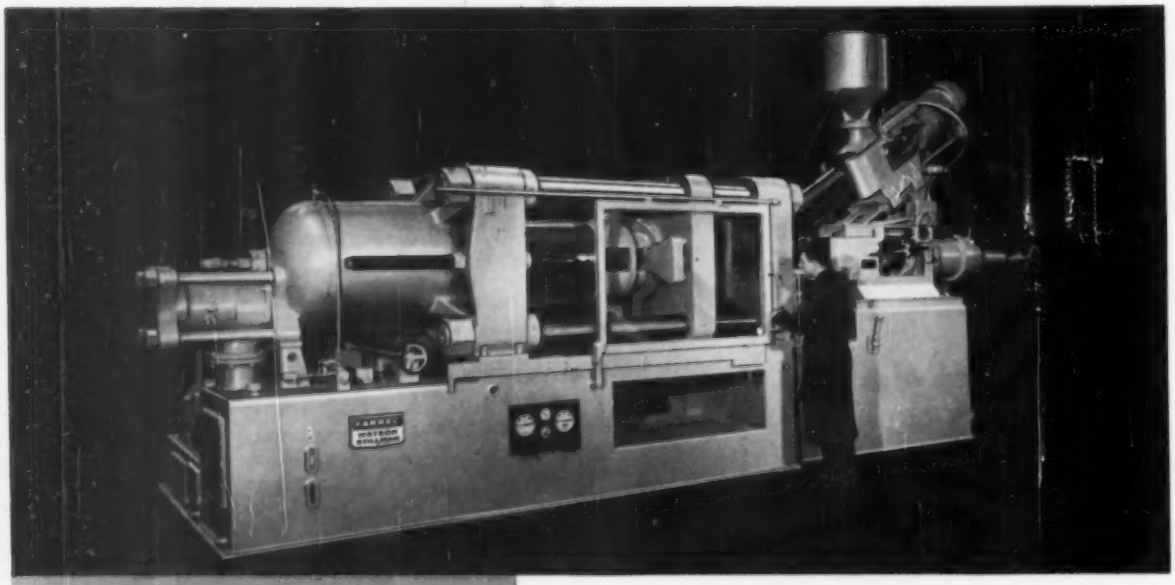
Pump Control . . . Five-way volume control gives you controlled speed for preplasticizing unit, independent control of whole machine.

Simplified Circuit . . . Reduces amount of piping, valves, etc. All components are accessible.

Complete specifications of this productive machine will be sent on request. Write today.

FARREL-BIRMINGHAM COMPANY, INC.
WATSON-STILLMAN PRESS DIVISION
565 Blossom Road, Rochester 10, N.Y.
Plants: Ansonia and Derby, Conn., Buffalo and Rochester, N.Y.
European Office: Piazza della Republica 32, Milano, Italy
Represented in Canada by Barnett J. Danson, 1912 Avenue Road, Toronto, Ontario
Represented in Japan by The Gosho Company, Ltd. Machinery Department, Tokyo, Osaka, and Nagoya

WS-71



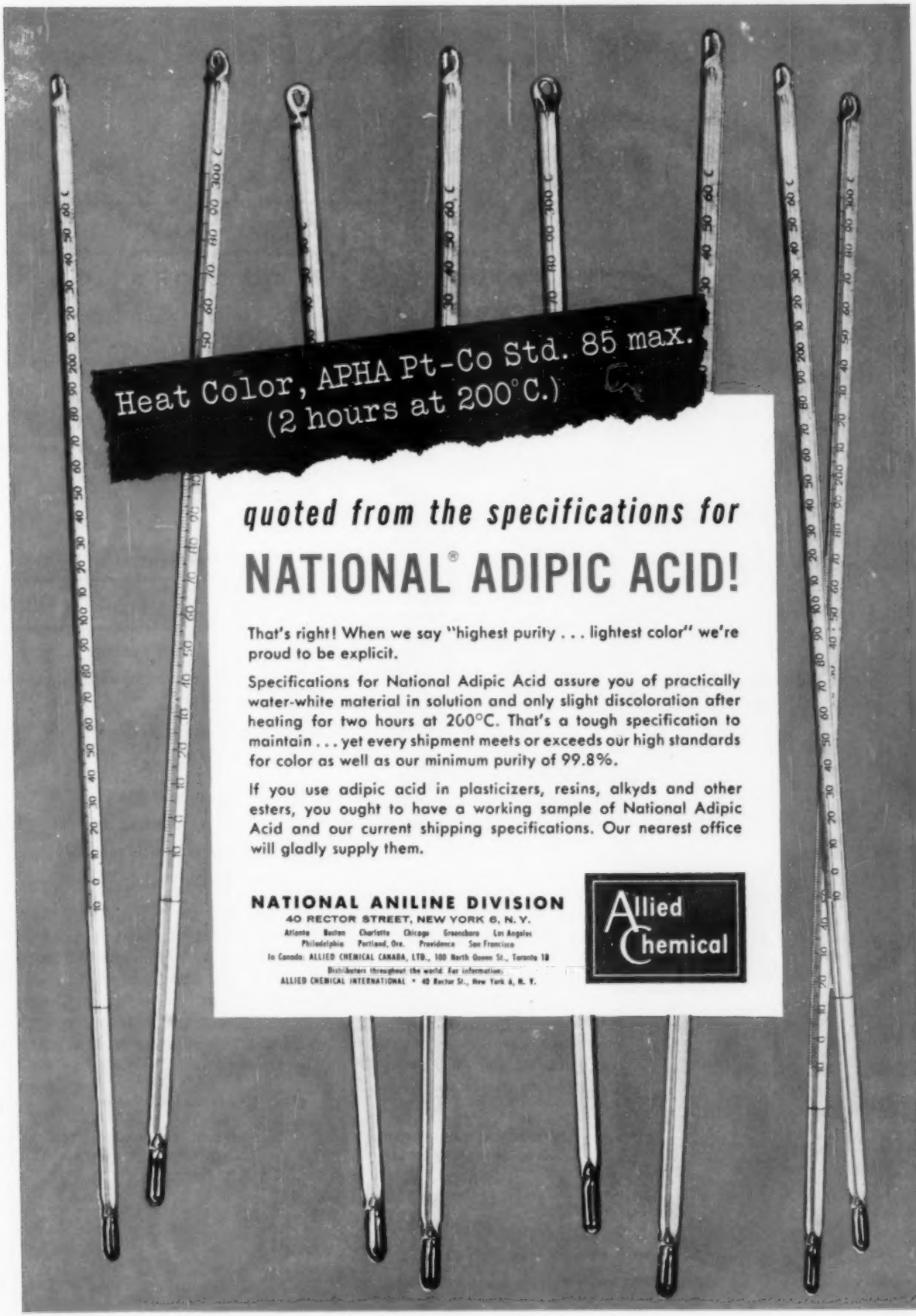
SPECIFICATIONS

Maximum ounces per shot (Styrene)	90
Plasticizing capacity per hour (Styrene)	285 lbs.
Shooting injection rate	1,800 cu. in. per min.
Clamping capacity	650 tons
Maximum Die Sizes	30½" x 48"
Daylight Opening	54"
Clamping Stroke	30"

(Booster system available for higher injection rates)

FARREL
WATSON
STILLMAN

Vertical injection molding machines, 1 to 24 ounces . . . horizontal injection molding machines, 5 to 500 ounces . . . transfer and compression molding presses . . . laboratory and general-purpose presses.


Heat Color, APHA Pt-Co Std. 85 max.
(2 hours at 200°C.)
quoted from the specifications for
NATIONAL® ADIPIC ACID!
That's right! When we say "highest purity . . . lightest color" we're proud to be explicit.
Specifications for National Adipic Acid assure you of practically water-white material in solution and only slight discoloration after heating for two hours at 200°C. That's a tough specification to maintain . . . yet every shipment meets or exceeds our high standards for color as well as our minimum purity of 99.8%.
If you use adipic acid in plasticizers, resins, alkyds and other esters, you ought to have a working sample of National Adipic Acid and our current shipping specifications. Our nearest office will gladly supply them.
NATIONAL ANILINE DIVISION
40 RECTOR STREET, NEW YORK 6, N. Y.
Atlanta Boston Charlotte Chicago Greensboro Los Angeles
Philadelphia Portland, Ore. Providence San Francisco
In Canada: ALLIED CHEMICAL CANADA, LTD., 100 North Queen St., Toronto 18
Distributors throughout the world. For information:
ALLIED CHEMICAL INTERNATIONAL • 40 Rector St., New York 6, N. Y.
Allied Chemical

HYSOL

OFFERS
A COMPLETE
LINE OF
SUPERIOR QUALITY
EPOXIES . . .

ADHESIVES & SEALANTS
ELECTRICAL INSULATING
COMPOUNDS FOR . . .
CASTING
ENCAPSULATING
IMBEDDING
IMPREGNATING
MOLDING MATERIALS
TOOLING MATERIALS
EPOXI-PATCH KITS
CAST ROD, SHEET & TUBE
CUSTOM FORMULATIONS
AND PACKAGING

HYSOL CORPORATION
formerly Houghton Laboratories, Inc.

Nothing has changed but the name . . .

Acceptance of our brand name HYSOL has been so universal that we are changing our name from Houghton Laboratories, Inc. to HYSOL Corporation.

As America's first manufacturer of the highest quality epoxy resin electrical insulating materials, adhesives, tooling materials and cast products, we believe HYSOL Corporation more accurately reflects the full scope of our products and services.

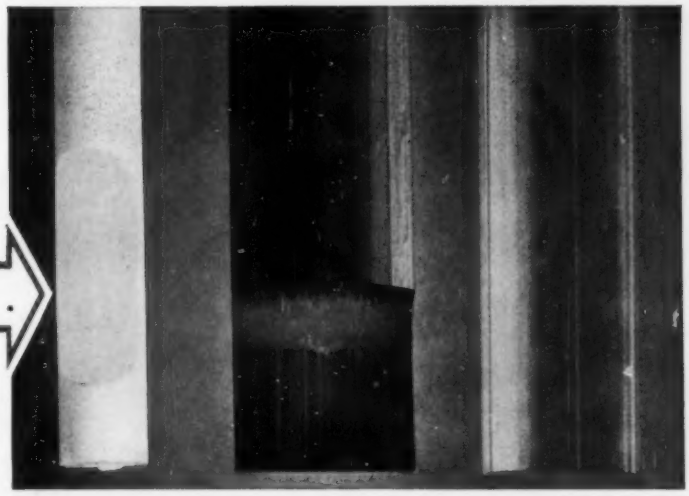
Nothing is changed but the name. Our company policy remains unchanged. We renew our pledge to a continuing program of research, responsibility and results which can only mean progress in the field of epoxy compounds.

HYSOL CORPORATION
OLEAN, NEW YORK
Progressive Products thru Chemical Research

HYSOL OF CALIFORNIA
LOS ANGELES, CALIF.

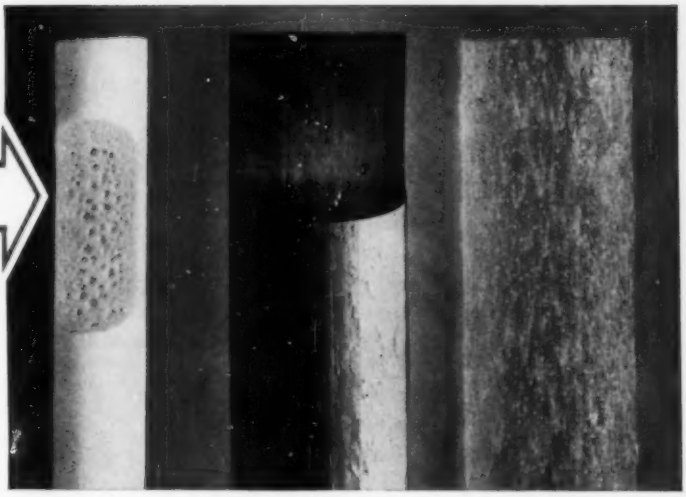
HYSOL (CANADA) LTD.
TORONTO, ONTARIO

make them like this...



dry blend PVC extrusions

instead of like this...



RIGID RIGID FLEXIBLE

New ESCAMBIA dry blend resins—plus new production techniques—now make possible the low-cost volume production of vastly improved extruded products. As can be seen from the unretouched photographs above, both rigid and flexible products can be made remarkably free of porosity and surface imperfections normally found in dry blend extrusions. As in other applications, ESCAMBIA PVC resins give you the additional benefits of outstanding heat stability, excellent color, unusual clarity, and high surface gloss. For more details on how you, too, can produce better products at a lower cost, contact your ESCAMBIA sales representative or write direct.

ESCAMBIA
CHEMICAL CORPORATION
261 Madison Avenue • New York 16, N.Y.
New York Telephone • OXford 7-4315

*ESCAMBIA is a trade mark of Escambia Chemical Corporation

Customers "feel" for quality in vinyl outerwear

That's why a fine "hand" is so important for vinyl fabrics. And, many producers are convinced that Plastolein Low-Temperature Plasticizers endow their products with the very best hand . . . the soft, suppleness that "makes friends" with the buyer right from the start.

These Plastolein Plasticizers keep him sold, too, by maintaining this fine hand at all temperatures, particularly throughout the chill range. And not for just a few months but *for many seasons* . . . even after prolonged exposure to summer heat.

Emery offers two outstanding low-temperature plasticizers: Plastolein 9058 DOZ, the ultimate in low temperature performance; and Plastolein 9078 L.T., its lower priced counterpart.

Write Department F-2 for literature.

PLASTOLEIN® plasticizers

Emery

Organic Chemical Sales Department

Emery Industries, Inc., Carew Tower, Cincinnati 2, Ohio • Vopcolene Division, Los Angeles—Emery Industries (Canada) London, Ontario—Export Department, Cincinnati

February 1960, Volume 37, Number 6

MODERN PLASTICS

DESIGNED BY FRANK LLOYD WRIGHT as an "ethereal mountain of light," this Elkins Park, Pa., house of worship features five-sided structure of corrugated reinforced plastics panels, typifies the kind of thinking which is expected to lead to vastly increased plastics usage in the building field.

REINFORCED PLASTICS...

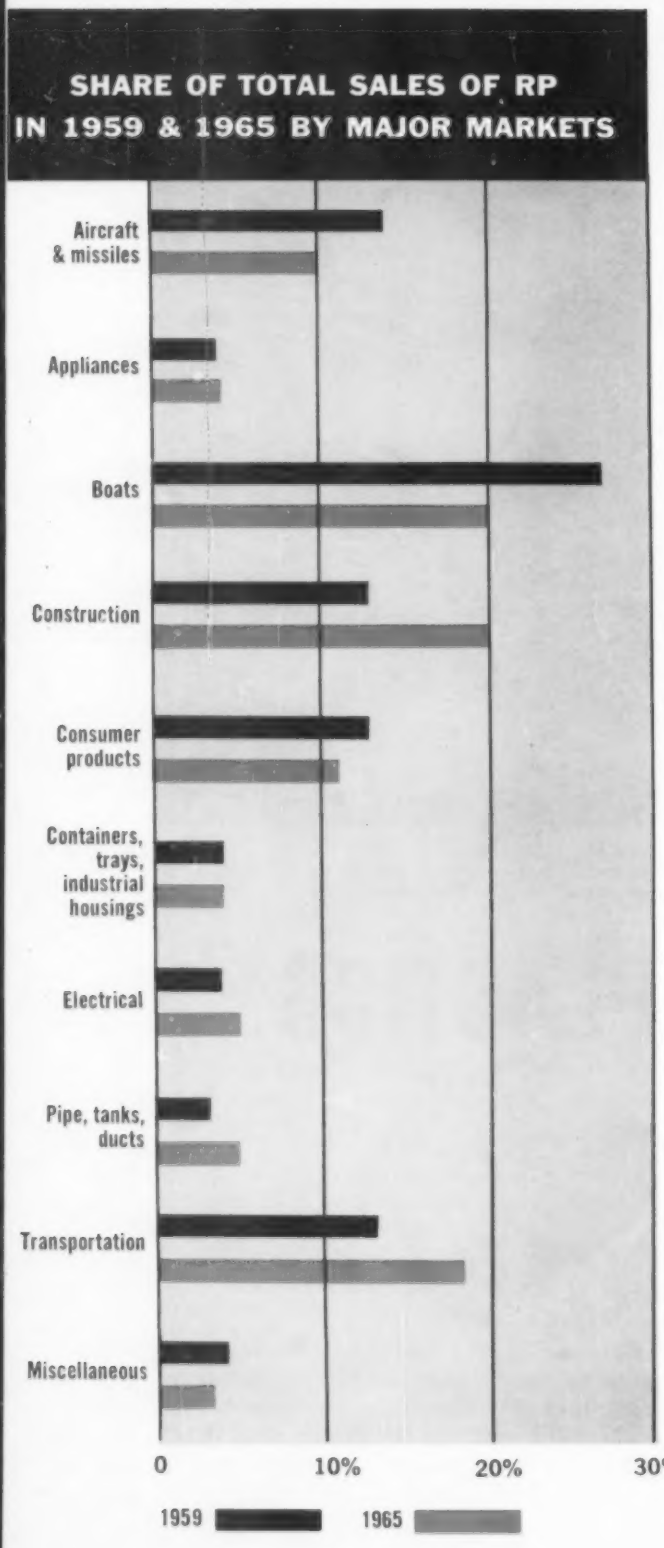
How they have done

Where they are headed

Sales of reinforced plastics were up *only* 42.5% in 1959. The "only" is used advisedly because this industry, which has a history of confounding both its critics and supporters, literally caught itself short last year—short of the fibrous glass that comprises close to 92% of its reinforcing materials.

Since mid 1959, glass reinforcement has been, in a sense, an allocation and no one has sharpened his pencil enough to figure just how much more than 264 million lb. of reinforced plastics might have been sold last year if manufacturers had been encouraged, rather than discouraged, in developing their proposals for new and unique products.

As for 1960, estimates of increased sales of



reinforced plastics are really estimates of how much new basic glass strand production will come in by the third quarter, in time to figure in the year's totals. These estimates range from 10 to 20%, from 26 to 52 million additional pounds of material.

Ferro Corp., Johns-Manville Corp., Owens-Corning Fiberglas Corp., and Pittsburgh Plate Glass Co. are all expanding old or building new facilities, but even the most optimistic among them concedes that supplies will be tight until June 1960 at the earliest. Two of the four see no ease-up before 1961.

On the other hand, there has been no shortage of resins. Plentiful supplies and production equipment to take care of the industry's growth over the next five years are consistently reported. There is even a new major source of polyester with Hooker Chemical Co.'s entrance into the standard polyester market. Furthermore, two major reinforced plastic processors —The Molded Fiber Glass Co. and Whitehouse Plastic Co.—went into the production of polyesters for themselves in 1959. There are those in the industry who foresee more of the same among molders and fabricators with high volume, concentrated production.

Half a billion by '65

For 1965, sales of reinforced plastics are being projected at an annual rate of close to 525 million lb., double the 1959 figure.

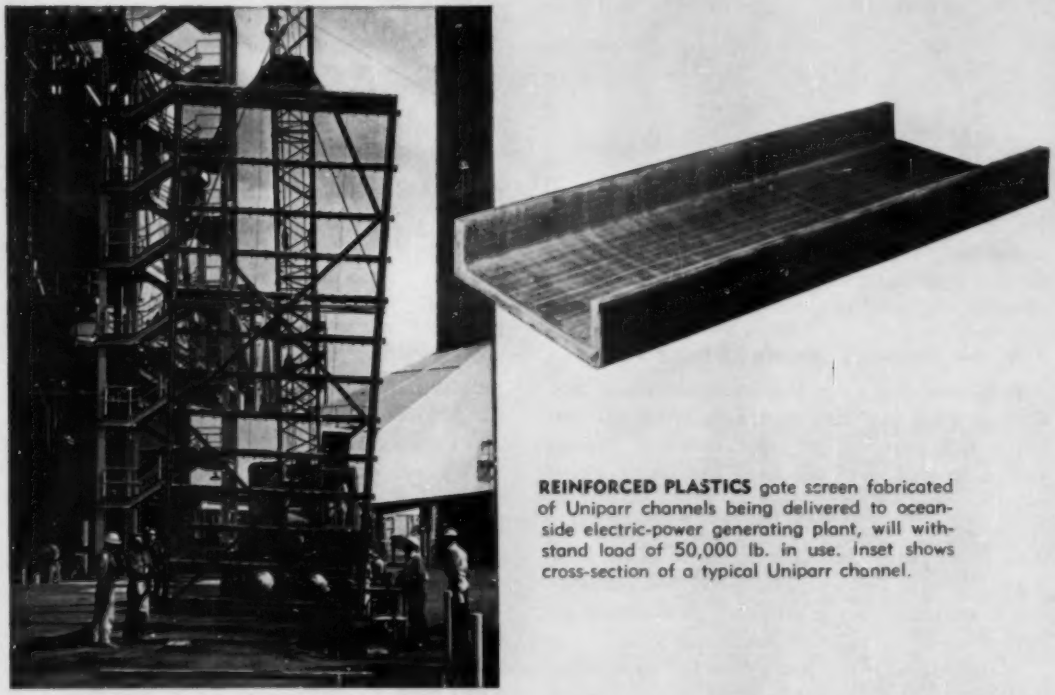
And where is it all going—the ½ billion lb. estimated for 1965 or even last year's ¼ billion pounds? Judging by the replies of resin and reinforcement manufacturers and processors to a survey conducted for MODERN PLASTICS, most of the 264 million lb. went into "more of the same," as one molder termed it. For the next five years the industry's growth figures are also based on further penetration of already proven markets, not on any revolutionary breakthrough or pie-in-the-sky thinking. In fact, any breakthrough—in construction for example—would throw all estimates out the window and send reinforced plastics poundage skyrocketing to new heights.

A comparison of the volume of reinforced plastics that went into its nine major markets in 1958 and 1959 (Table I, p. 86) shows that 70% of the industry's growth last year was in the boating field, in aircraft, and in missiles. Use in boats went up 93%; in aircraft and missiles, 100 percent. Next were construction, consumer products, and transportation.

Boats and aircraft and missiles will continue

to use more of these materials during the next five years, but neither field is expected to consume such big percentages of yearly poundage. Instead, as shown by the chart on the opposite page, a bigger share of the volume will go into transportation and construction. Transportation should account for 18% of the ½ billion total estimated for 1965 as against 13% of 1959's 264 million pounds. Construction within the next five years should take a good fifth of the poundage, matching the volume going into boats by 1965.

Such a leveling off in boats and in aircraft and missiles is to be expected. In the case of boats, for example, reinforced plastics have already captured approximately 36% of the small boat industry. In the transportation field, which comprises a much larger market than



REINFORCED PLASTICS gate screen fabricated of Uniparr channels being delivered to ocean-side electric-power generating plant, will withstand load of 50,000 lb. in use. Inset shows cross-section of a typical Uniparr channel.

RP "timbers" solve a troublesome power-plant problem

Heavy fibrous-glass-reinforced structural members consisting of multiple layers of RP laminate are today solving a major corrosion problem for the Southern California Edison at its Huntington Beach power plant. The company uses the ocean as a source of cooling water. They replace stainless steel structures at a cost saving of 67 percent.

All of the reinforced plastic channels and other structural members used in the screen frames are solid polyester laminates with a minimum cross-section thickness of ⅜ inch, made up of multiple layers of a laminate material called Uniparr, produced by Uniparr Corp., Palo Alto, Calif.

The parallel and prestressed fibers in the Uniparr sheet can be oriented to meet the specific requirements of the particular part being constructed. If, for instance, a member is to be fabricated for loading with 90% of the force in one direction and 10% in another, the fabricator can orient 9 layers of Uniparr one way and the 10th layer in the other appropriate direction.

In use the screens are designed to withstand a head differential of 3 feet, the equivalent of a 50,000 lb. load. Actually when the head differential reaches .6 lb. the screens are automatically raised and flushed clean by a series of water jets. By using the screens in pairs, the second screen is always in place while the first is being cleaned.

Table I: Estimated RP usage in major markets, 1958-1965

Markets	1958/lb.	1959/lb.	1965/lb.
Aircraft & missiles	18,500,000	37,000,000	52,500,000
Appliances	7,400,000	10,750,000	21,000,000
Boats	37,000,000	71,000,000	105,000,000
Construction	31,450,000	37,000,000	105,000,000
Consumer products	24,050,000	34,000,000	57,750,000
Containers, trays, industrial housings	7,400,000	10,750,000	21,000,000
Electrical	7,400,000	10,750,000	26,250,000
Pipe, tanks, ducts	5,550,000	8,000,000	26,250,000
Transportation	29,600,000	34,000,000	94,500,000
Miscellaneous	16,650,000	10,750,000	15,750,000
	185,000,000	264,000,000	525,000,000

boating, these materials have had a much briefer history and have penetrated less than 1 percent. In other words, they have much farther to go in transportation before they come close to any kind of saturation point.

The raw materials picture

Polyester continues the dominant resin, and fibrous glass the dominant reinforcement. By percentage, the use of each, however, is expected to drop over the next five years. Polyester volume will not increase quite as fast as the industry total. Instead of accounting for 90% of all resin, its share of the total by 1965 is pegged at 85 percent. The same 1965 percentage is estimated for glass fiber, down from its 92% share of all reinforcement last year.

A considerable market exists for such reinforcing agents as asbestos, kraft paper, cotton, rag, felt, jute, sisal. Consider only Ford's 1800 to 2400 lb./hr. compounding capacity for sisal-reinforced polyester premix. Raybestos-Manhattan Inc. projects a doubling in the use of asbestos in 1960 over 1959 with poundage doubling again about every two years over the following six. This company further estimates that, for the asbestos reinforced field in general, considering all types of resin systems, approximately 60% of the business is in molding compounds and 40% in asbestos cloth, felt and mat reinforcements. The big market here is the rocket and missile field with its need for good thermal insulation, ablation resistance, very high strength-to-weight ratios, and superior resistance to shock. Exact figures, though, are not to be had.

The limiting factors for jute, sisal, and other soft fibers are low resistance to water absorption and bulk. Only the development of resins with much harder surfaces will put them into any competition with glass reinforced plastics.

Glass fiber producers claim that they have

ACCIDENT damage to RP cab is limited and easily repaired. Photo at left shows how damage was confined to point of impact. At right, after 4-hr. repair, is fully restored cab, masked for painting. With metal cab, damage would have been more extensive, and the repair more expensive.

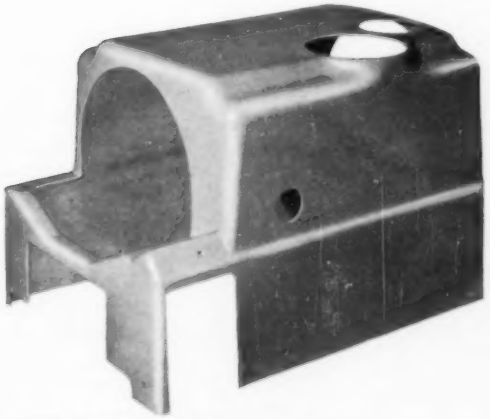
not felt nor expect to feel competition from these materials.

As for what's ahead: a growing use of non-woven fabric and of pre-impregnated roving is expected. Synthetic fibers more suitable for reinforcing are due to appear. The synthetic fiber industry hasn't paid too much attention to reinforced plastics in the past because of its low volume. Now, with satisfactory markets established, this will change.

Like the glass fiber producers, suppliers of polyesters make the point that with the RP industry as a whole expected to double its annual poundage in the next five years, the 5% reduction in polyester's share hardly represents an inroad into their expanding market.

Six million lb. is probably fairly close to the amount of epoxy resin used by the industry in 1959; 4 to 5 million for phenolics. Obviously, the importance to reinforced plastics of these materials, or of the acrylics, fluorocarbons, silicones and other resins, is not in their volume.

It's their notable use, like helping to bring our two space monkeys back safely. In this instance, a ceramic fiber reinforced TFE fluorocarbon laminate, developed by Rogers Corp., afforded the low ablation characteristics, and resistance to cold flow and deformation under load necessary for the electronic windows of these Thor-Able re-entry missile nose cones. Phenolics, too, have put reinforced plastics in the running in missile, aircraft, and electrical applications with high heat resistant requirements. The epoxies have taken over the fila-



HOUSING FOR DRILL GRINDER produced by the Cimastra method of slurry preforming developed by Cincinnati Molding Machine Co., and particularly suitable for products designed with large-area, deep, thin-wall sections.

FIRST REINFORCED PLASTICS airborne seating, the Jet Star executive chair has a shell construction filled with Freon-foamed urethane.

RP seats take to the air

The first reinforced plastics chairs for airborne seating are being introduced this month on the Lockheed Jet Star, a craft designed for training purposes and corporate executive use. The success of these chairs over a two-year test period foretells a new market for RP seating—airplanes.

According to spokesmen of the Plastics Fiberglass Div., L. B. Smith Aircraft Corp., Miami, Florida, fabricator of the unit, use of the new seats represents a 30% reduction in weight over a conventional chair of the same configuration. At the same time, it is estimated that this same chair produced in metal would have cost 30% more. Production is by hand lay-up, using glass cloth and polyester resin supplied by Glascoat Corp., Miami, Florida. The chairs are molded in two parts, inner and outer shells, which are then bonded together with polyester resin. Next, three holes are drilled into the outer shell, and a liquid urethane foam mixture introduced for in-place expansion, using a Freon blowing agent. This construction provides added strength to the chair without weight penalty.

Cushioning is provided by both polyether and PVC foam materials.

The chair, as well as the entire plane interior, were designed by Henry Dreyfuss, New York.

MAJOR PARTS of Little Joe missile capsule being fabricated of Fiberglas-reinforced Hetron 72 polyester at NASA Langley Research Center, Hampton, Va. In foreground is base; at left center of the photograph is the heat shield. Other units are aluminum afterbodies.

ment winding field. The top volume use of these resins in reinforced plastics is as impregnants for kraft paper in electrical laminates.

As for the fire-retardant polyesters, currently there are three producers: Hooker Chemical, the major factor in the field; Allied Chemical Corp.; and American Cyanamid Corp. Opinions within the industry are divided as to the impact, to date, of these resins.

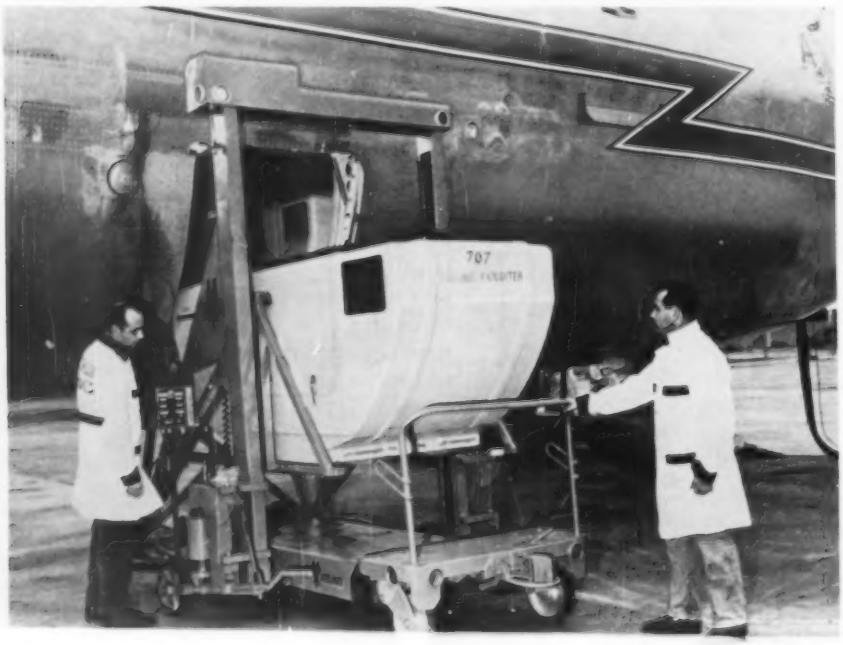
There are indications that still other modifications of the familiar polyesters will be playing increasingly important roles in reinforced plastics. Several companies report that isophthalic-type polyesters are moving in encouraging volume, particularly in premix. A new polyester developed last year was a resin with alkali resistance approaching that of epoxies and priced in the range of conventional hand lay-up resins.

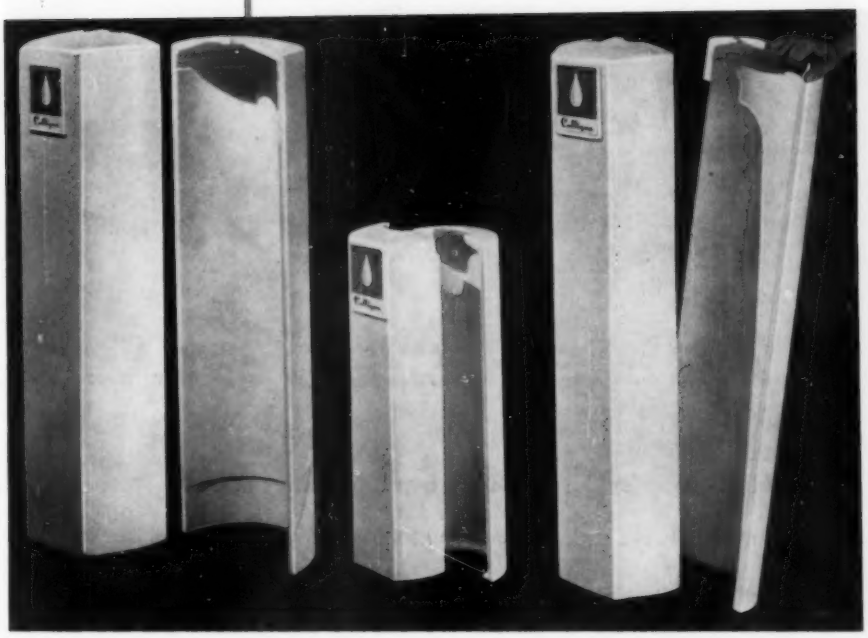
Processing advances

Hand in hand with the industry's concern with better, more suitable materials goes the insistent call for faster handling of reinforcements, faster cure, faster cycling. Queried on advances in processing, materials suppliers and processors cite the speedup in hand layup through use of the spray gun, speedup in preforming with the use of a slurry process, and a rotary preformer which can effect up to 300% savings in labor.

Faster, easier production has been an important factor in the growth of (To page 170)

BAGGAGE STORAGE CONTAINER on American Airlines 707 jets can hold 1400 lb. of luggage, is easily conveyed to claim area. Six such units are carried per plane.





INSULATION JACKETS for water softeners are molded in two halves and three sizes, ranging to 42 in. in length. Larger units are for 9- and 12-in.-diameter softener tanks. Double-backed adhesive tape is used in mounting the jackets on the tanks.

No sweat with foam jacket

Use of molded polystyrene foam panels on water conditioners solves common problem at lowest cost

Bothersome condensation problems on galvanized water softener tanks have been overcome by Culligan Inc., Northbrook, Ill., through adoption of insulating jackets molded of expandable polystyrene foam to prevent excessive tank sweating, rust streaks on the metal tank, messy floors, and mop-ups caused by variable humidity conditions.

Made in matching "half shells," the enclosures, styled by Reinecke & Assoc., Chicago, Ill., are produced in three sizes to fit Culligan's new Pioneer automatic softener and the standard 9- and 12-in. diameter models. The jackets range from 32 to 42 in. in height; wall sections range from ⅝ in. for the smallest unit to ⅞ in. for the 12-in. jackets; density is 4 lb./cu. foot.

Made with mating butt joints, the jackets are slipped around the softener tanks after installation and joined by double-faced adhesive tape. A nonhardening, bead-type sealer is applied around all openings around the tank to insure a proper vapor seal.

Jackets are supplied as standard equipment with the Pioneer model and are available as optional equipment on the 9- and 12-in. standard automatics. The front half of each enclosure is designed with a raised panel at the top on which a pressure-sensitive label is mounted.

Culligan engineers point out that by purchasing a standard galvanized tank plus the optional styrene foam jacket, the consumer pays no more than for an unjacketed tank with a baked enamel finish—which does not eliminate the condensation and sweating problem. Also, the foam jacket with its distinctive styling gives the softener a more attractive appearance. Had Culligan attempted to solve the problem by means of a sheet metal jacket, with a layer of insulating material between it and the tank, die cost would have been prohibitive in relation to volume. Furthermore, this approach would have involved costly fabricating and finishing operations not required with the plastic foam jacket, and it would have been virtually impossible to achieve the necessary vapor seal around openings in the softener tank.

Jackets are molded by Glo-Brite Products Inc., Chicago, and Kalamazoo Plastics, Kalamazoo, Mich., using Dow Pelaspan and Koppers Dylite expandable styrenes.—End

ABS SHELLS SAVE $14 PER

Molded projectiles now used by all branches of U. S. Armed Forces to train mortar men simulate field conditions without use of live ammunition

Re-usable plastic projectiles, costing less than a penny per firing, have replaced live shells—at $14 per shot—in the program for training men of the U. S. Armed Forces in the handling of mortars.

The projectiles, which have a casing of molded acrylonitrile-butadiene-styrene copolymer (ABS), are now standard with *all* branches of the Services; and, while the exact number of these mortar missiles is classified, it can be stated that it is "very large."

Molded into the shell casing is a chrome-plated threaded-steel insert, which receives the steel nose holding the explosive charge, which consists of a .22-cal. blank cartridge.

MORTAR TRAINING SHELL molded of ABS material being loaded into barrel of modified weapon. Specs call for 1000-firings re-usability.

The shell is ejected from a modified mortar by air pressure. At the target, the heavy steel nose strikes the ground first, and inertia causes the firing pin to move downward and explode the .22-cal. blank.

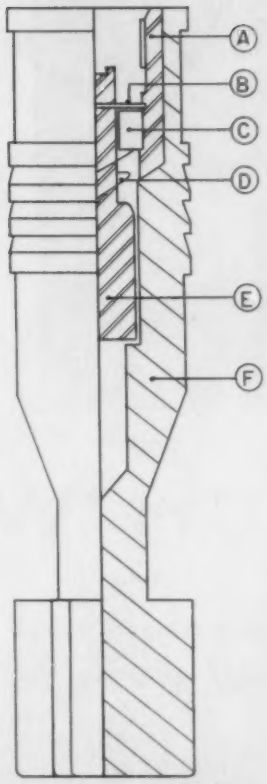
There were six service requirements the new missile had to meet. It had to be 1) re-usable; 2) properly balanced to minimize ballistic error and provide aerodynamic stability; 3) strong enough so that no more than one missile out of 1000 firings be damaged; 4) operable at temperatures ranging from 10 to 105° F.; 5) capable of storage under temperature extremes of −40 to 125° F., and 95% humidity conditions at 70° F.; and 6) capable of being fired with specified accuracy at distances ranging from 140 in. to 0.03 mile.

Why ABS was chosen

Initially, aluminum housings were tested for the missile, but were rejected because they dented upon striking the ground. Nylon, butyrate, impact styrene, and ABS copolymer were then tried. The last material was the only one to meet all the requirements, and was particularly desirable for high impact strength, low heat distortion, and ability to retain an insert. The material selected was Cycolac, manufactured by Marbon Chemical Div., Borg-Warner Corp., Washington, W. Va.

The projectile weighs slightly over 5 oz., with the hardened steel components, and is about 6 in. long. Maximum wall thickness is 0.005 inch. Weight of the plastic part is 1 ounce, while the missile tolerances (O.D.) are ±0.003 in.,

FIRING



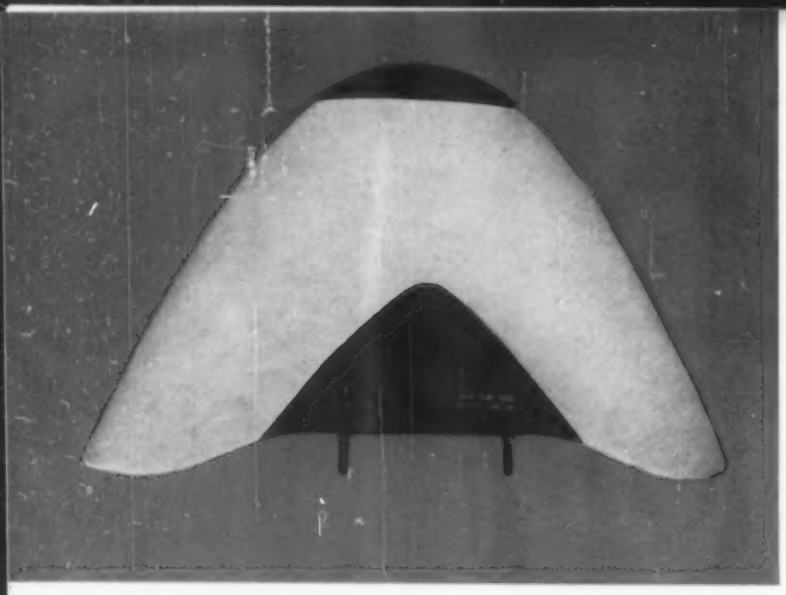
CUT-AWAY VIEW OF MISSILE (far right) and schematic drawing show working parts, as follows:
A) Chrome-plated steel insert, threaded to receive steel nose containing explosive blank
B) Snap ring for assembly
C) Metal ring to contain downward motion of firing pin
D) Firing pin retaining spring
E) Steel firing pin
F) ABS casing
Over-all height is 6 inches

to prevent leakage of air used in propelling the shell. The missile was designed so that no plastic part would come into contact with the explosive charge, which necessitated insert molding of the chrome-plated steel bushing.

The missile housing is engineered and injection molded by Robinson Plastics Co., New York, N. Y., for Anchor Mfg. Co., New York. The molder uses a two-cavity cam-action three-plate mold on a 16-oz. Watson-Stillman machine. The mold, built by Lincoln Mold & Die Corp., East Orange, N. J., has removable cores, which allow a long time for annealing and cooling of the piece outside the mold. Injection line pressure is 1400 p.s.i., and clamping pressure 285 tons. Mold temperatures are closely controlled by placement of four pyrometers on four different areas of the mold.—**End**

MISSILE IN FLIGHT (circle). Steep trajectory is very similar to that of live shell. Stability in flight is achieved by careful aerodynamic design. Supply of plastics shells is conveniently carried in rack (left).

Photo, U. S. Army



RADOME for DC-8, shown installed at right. Process by which these structures are made is illustrated in photos below and on next page.

SANDWICH 'WITHOUT'

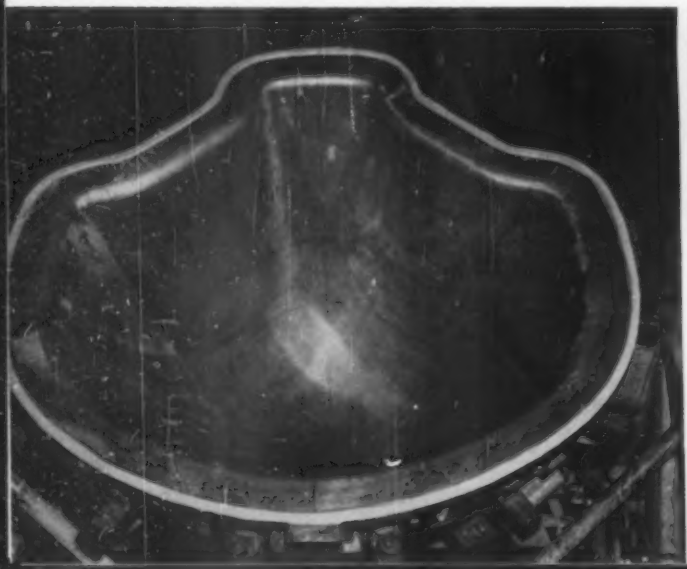
New process, originally designed for making radomes, permits laminate-sandwiches to be built all at once, core and skins together

A modification of the lost-wax process has been developed by Douglas Aircraft, Santa Monica, Calif., to provide integrally molded flutes to circulate hot air for anti-icing. But it has proved so economical that Douglas is presently using it for virtually all of the plastic-laminate sandwich structures found in the new DC-8 jet airliner. Several companies are also using the technique under Douglas license.

The new process developed by Douglas differs significantly from conventional lost-wax casting. In the latter case, the wax is used only as an aid in forming a mold for the casting. Plaster or some similar material is poured around a wax form that exactly matches the finished casting. When the mold has hardened, the wax is melted out and the casting material poured into place. A new mold is required for each part that is cast.

In the new technique, on the other hand, the

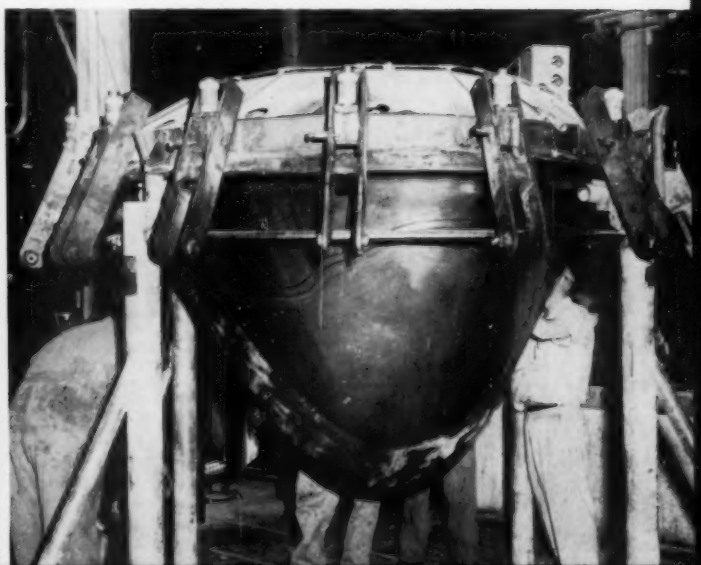
1: Outer skin has been laid up in mold.



2: First course of wax flutes is positioned.

3: Membrane doublers are tailored and impregnated.

4: Inner skin is laid up on male plug of mold.



wax casting is itself the mold around which the laminate is formed. When the wax is melted out, it leaves an open cavity within the laminate structure. There is no second step; the open, wax-free laminate is the finished product.

What does it accomplish

The advantage of the Douglas lost-wax process in sandwich making is that it permits the sandwich core and skins to be fabricated as a single, integrated reinforced plastic structure. Normal procedure in the building of a sandwich structure is to bond laminate skins to both sides of a light-weight, low-density material such as honeycomb or foam.

The lost-wax process permits the fabrication of an open, light-weight core at the same time that the skins are formed. Instead of two distinct operating steps—the fabrication of the core material and the building of the sandwich structure—the lost-wax process allows the sandwich to be built all at one time, core and skins together, as part of a single manufacturing procedure.

Built-in deicer

Original application for lost-wax laminating technique in aircraft construction, and still the most important single use, is in the fabrication of radomes.

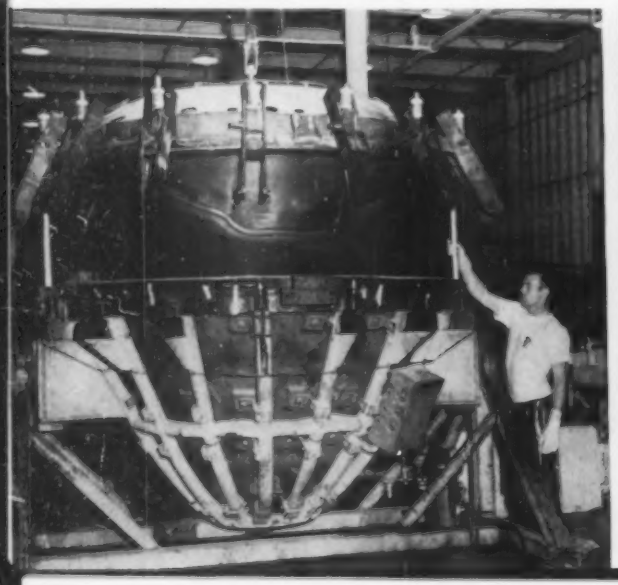
The DC-8 radome pictured on pp. 92-93 is typical. Over five feet in diameter and serving as the extreme forward section of the jet-liner fuselage, it must withstand the buffeting of near-sonic speeds. Passengers and crew depend for their lives on its air-worthiness; if the radome structure were to fail, the pilot would find it almost impossible to bring the ship in for a safe landing.

At the same time, the radome must have precise electrical characteristics for the proper transmission and reception of microwave signals. This makes it necessary that an effective method be found for preventing the build-up of ice on the outside of the radome, since this would obviously change the housing's electrical characteristics.

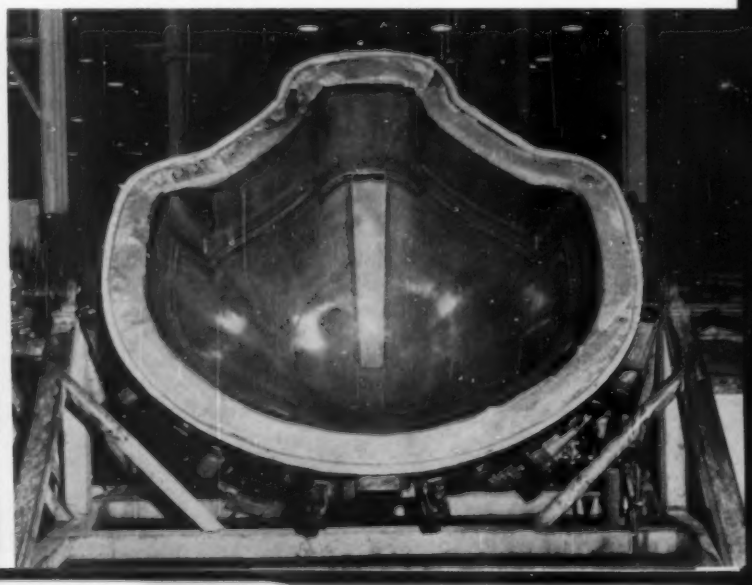
Originally, radomes were of solid laminate construction, and hot air circulating inside the radar chamber was generally sufficient to prevent icing. Later, sandwich-type structures were introduced to obtain a better strength-weight ratio. This created a problem since honeycomb sandwiches are excellent insulators and it was almost impossible to get enough heat through the sandwich shell to melt the ice without burning up the radar equipment inside the enclosure. Engineers tried vainly to find chemical compounds or coatings that would prevent ice from forming, but it soon became clear that a new and different approach to the problem was needed.

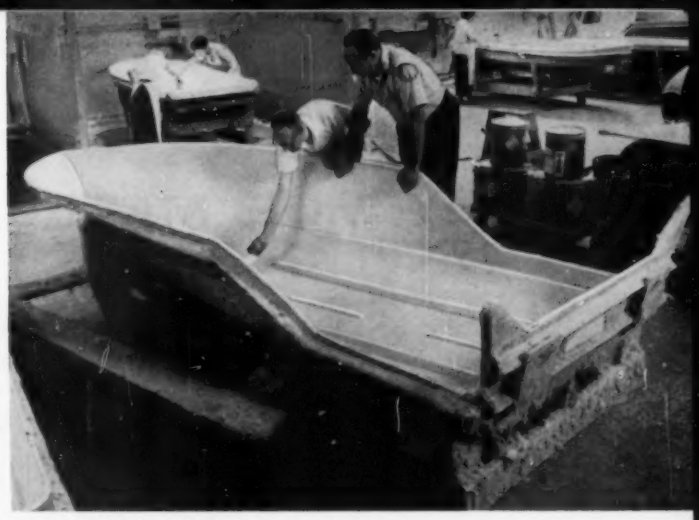
The result was the development of a new type of sandwich construction, based on the lost-wax process. Instead of honeycomb or foam, the core consists of open channels running longitudinally between the skins. Through these open channels, engineers direct hot air from jet-engine compressors. The high-temperature air easily warms the outside surface of the radome since the heat has to pass through only a single laminate layer. At the same time the hot-air blast is directed away from the radar equipment inside (To page 181)

5: Male and female mold parts are aligned preparatory to molding.

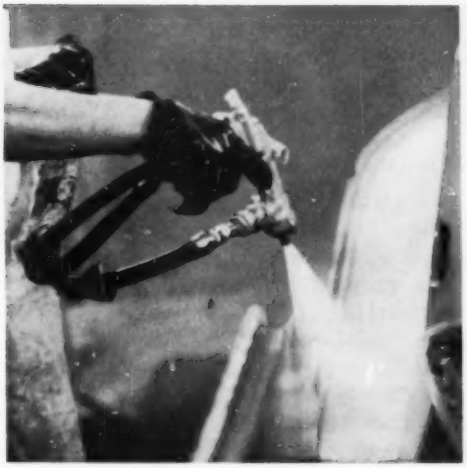


6: Cured shell showing wax demi holes.





HULL MOLD IS CHECKED at Tomahawk plant prior to waxing. In background are boats in various stages of completion.



PROMOTED AND CATALYZED polyester is sprayed onto hardened shell coat. Ply of glass reinforcement is added later.

New resin-gun system speeds boat production

By designing polyester for one particular type of spray equipment, manufacturer saves plant space, labor, resin

The spiraling statistics of the reinforced plastics boat market (see page 172) have boat fabricators scrambling to get maximum output from their present production facilities.

One company has scored impressive results in this race for more production by using a new resin and a spray-gun system.

The company: Tomahawk Boat Co., Tomahawk, Wis.

The claimed result of this new development: 1) a 40% increase in the number of boats produced in the same plant space; 2) a 10% saving, by weight, in resin requirement; and 3) a 25% decrease in labor needs.

The gun: Tri Kris, made by Tri-Kris Co., Lansdale, Pa.

The resin: Vibrin 158A, a new polyester specially made for spray-gun use by Naugatuck Chemicals Div., U. S. Rubber Co.

The gun is of the type which sprays a blend of promoted and catalyzed resins onto laid-up glass fibers, in mat, cloth or rovecloth form. Such guns are operated with one hand (like those that deposit both resin and cut glass fibers onto the mold surface) and are claimed to deliver up to 35 pounds of resin per minute.

To take advantage of the fact that the resin guns work fast, since no mixing of promoters, catalysts, etc., is required, material makers have been working out special resin formulations for them. Requirements are: 1) low specific gravity. This allows less resin, by weight, to be used, thereby lowering costs, and lowering the ratio of weight to motor horsepower for better boat performance; 2) controlled exotherm to prevent heat build-up and loss of strength in a big, heavy boat or too-slow cure of a small boat; low water absorption with good wet strength retention and good aging; and good physical properties. (To page 184)

WHY MOP MAKER TURNED TO PE

In redesigning its line of dust mops in plastics, O-Cedar, Division of American-Marietta Co., Chicago, Ill., aimed at overcoming a number of problems associated with its former models:

1. Only 85% of the mop yarn was available for sweeping. The other 15% was sewn into the cloth bumper which was used to hold the mop mitt onto the head.

2. Three separate sewing operations were required to make the mitt. The yarn was first sewn to the cloth bumper. The bumper ends were then overcast to prevent unraveling. Last, cloth ties were sewn on and the completed mitt was attached to the metal head.

3. The three-piece metal head was made in four separate fabricating and finishing operations: stamping, plating, riveting, and crimping.

4. Finally, the mop's total weight of 1½ lb. was too heavy, requiring the woman to use two hands to maneuver it properly.

In cooperation with its industrial design consultants, Palma-Knapp Assocs., Forest Park, Ill., O-Cedar developed two plastics heads that solved these problems, and provided other advantages as well.

The first head consists of two molded polyethylene pieces: the triangular head and the handle socket. The socket attaches to the head by a spring clip and axle, and enables the handle to be moved back and forth.

Three polyethylene pieces are used for the second mop. The head itself is round. A PE grommet snaps into the head's center hole and can rotate. The handle socket fits onto the grommet. With this arrangement, the handle can swing back and forth when the mop is in use, while at the same time the mop head can rotate through 360°.

What are the advantages?

Use of plastic for the head assembly provided immediate advantages. Only two processing steps are involved: molding and assembly. There is no need to stamp, plate, rivet, and crimp metal parts. The plastic costs less. In fact, the cost of the handle socket alone equals the cost of plating the old metal head.

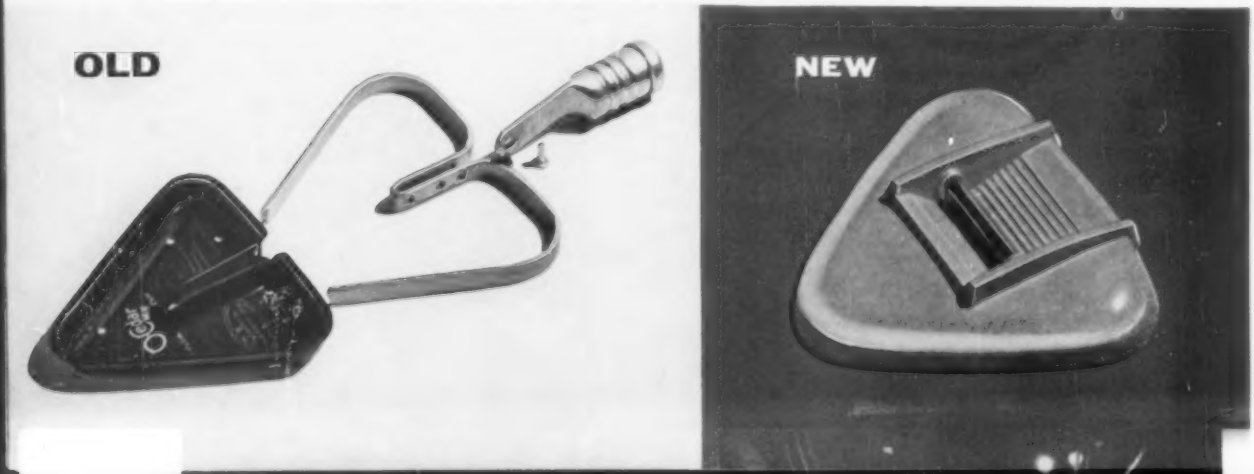
In weight, the complete new assembly totals 5 oz. against 15 oz. for the metal head. This weight reduction enabled O-Cedar to switch to a ¾-in. diameter handle instead of the former ⅞-in. diameter. The overall weight reduction of almost ¾ lb. enables the mop to be easily maneuvered with one hand; it also brings freight advantages.

Another saving was gained by eliminating the threads on the old handle and socket. Instead, the new socket is molded with internal ribs. The handle is pushed tightly into the socket. The ribs bite firmly into the wood and hold it securely without threads.

By using the polyethylene head, Palma-Knapp was able to devise an entirely new way of making the yarn mitt. Instead of sewing the yarn to cloth tape and then folding the cloth to make the bumper, the yarn is sewn directly to a beaded vinyl tape in continuous rolls. The tape is extruded by Resincraft Plastics Inc., Chicago, of Union Carbide Plastics' material.

When the roll is cut, an automatic cementing

MOP HEAD made of metal (left, below) required three parts, four production steps: stamping, plating, riveting, and crimping. New polyethylene head (right, below) is made in two operations: molding and assembly.



Switch from metal resulted in 25% labor saving, weight reduction of 50%, lower material cost—and a better product for bigger sales

operation takes care of the edges. Previously, after cutting, the edges had to be overcast as a separate sewing machine operation. In addition, only ¼ in. of yarn is taken by the tape instead of 1½ in. previously required for the cloth bumper. This makes for an immediate gain in the cleaning surface.

The new head is molded with a grooved channel on its underside. The bead on the plastic tape is fed into this channel which grips it securely. Thus, there is no need to tie the mitt onto the head with string ties.

This string tying operation was formerly done by hand. With the bead and channel method, it is accomplished mechanically.

Parts are produced in six-cavity molds on 12-oz. Impco injection machines by Korris Products Inc., Lyons, Ill. The company also designed the molds.

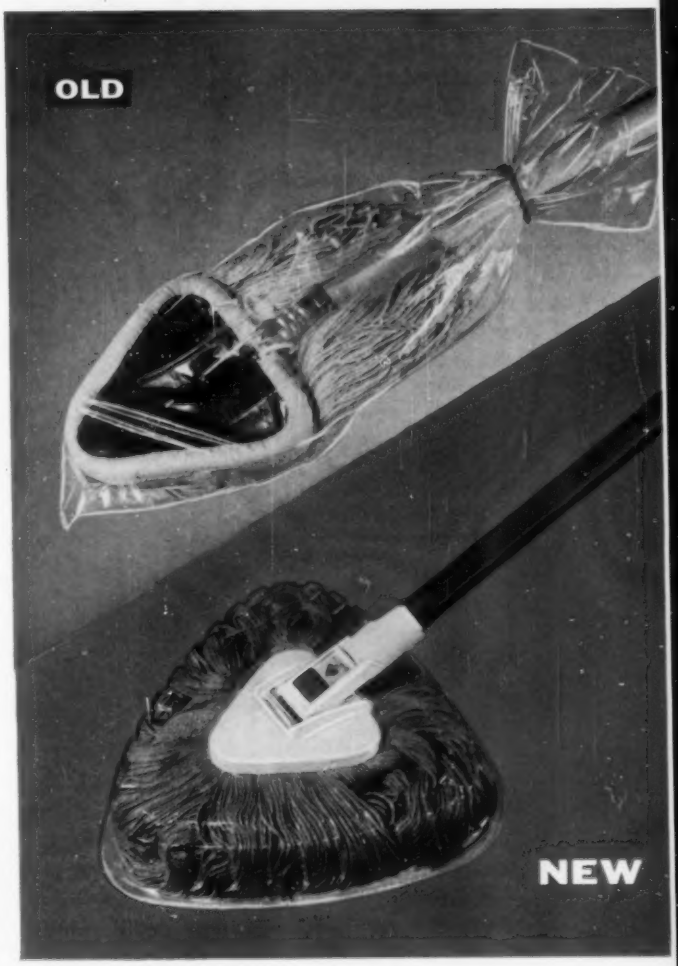
New mop, new package

The old mops had been provided with a cord-tied polyethylene bag around the mop head. This wrapping gave no shape to the mop. Instead, the yarn hung in a loose ball.

The new packaging consists of a rigid oriented polystyrene (Plax Corp.) pressure-formed in the triangular or round shape of the mop head by Poster Packaging Inc. Div. of Poster Products Inc., Chicago. Thus, the mop head is displayed in the characteristic shape it has when in actual use. An opening at the top of the package allows the handle to be snapped on and the mop to be demonstrated by salespeople in the store without soiling the yarn.

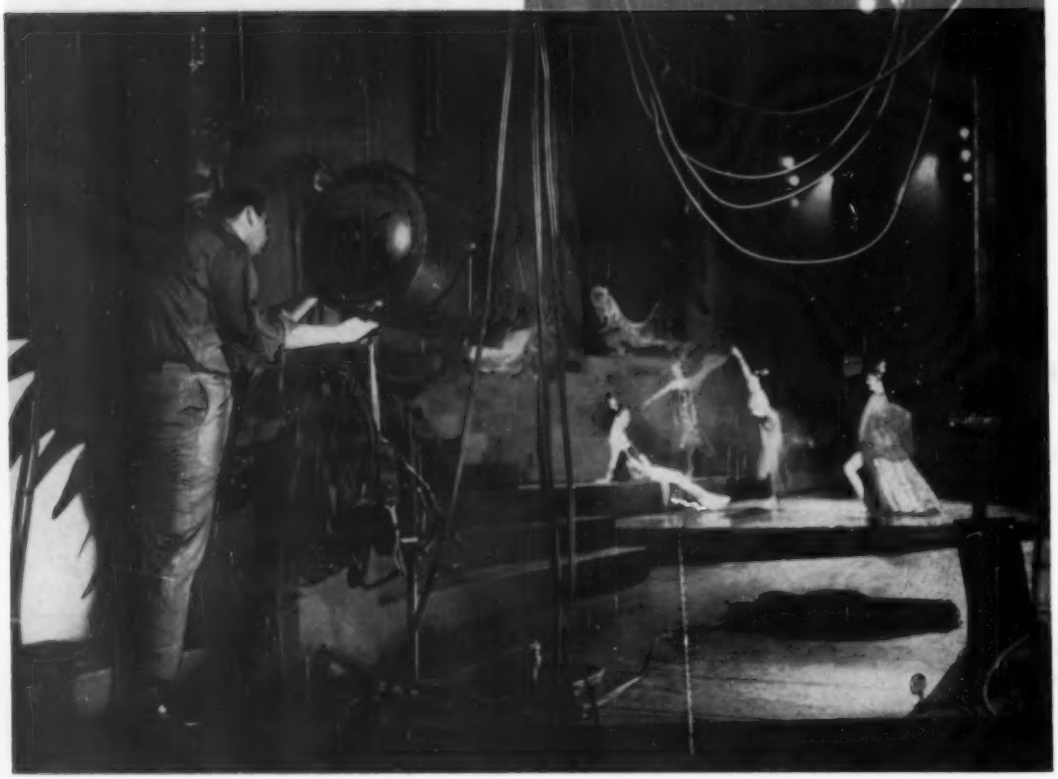
"Mops are an impulse item," the designer states. "By going to this type of packaging we gain a much better display. The overall savings made in the cost of producing the mop enables us to use this more expensive packaging and still come out ahead."

The triangular mop, called the Lady Marietta, is made of Dacron-cotton yarn and retails for $2.98. The round mop, named the Marionette, is made of nylon-cotton yarn and lists for $1.98.—**End**



PACKAGE FORMED of oriented styrene replaces shapeless PE bag previously used.

SIMPLE ASSEMBLY replaces complicated hand tieing of mop mitt to head. Yarn is sewn to beaded vinyl tape which fits into channel molded into PE head. Cementing completes assembly.



LIGHT WEIGHT OF PVC cables simplified changes in electrical setups backstage at Radio City Music Hall. Cables also proved highly practicable in crowded working areas, afforded excellent toughness and safety factors.

Light cable for

Heavy-duty vinyl-sheathed cables are proving their superiority over conventionally constructed lines in two large market areas: coal mine trailing cables and theatrical lighting. In both fields they have met tough safety requirements, simplified handling problems, and provided cost savings.

Bulk cut by half, weight by third

Vinyl-covered stage cables were first developed by Plastic Wire and Cable Corp., Jewett City, Conn., using its own formulation of B. F. Goodrich Chemical Co.'s Geon resin to meet a need for less bulky, heavy-duty stage cables for Radio City Music Hall, New York City. In this instance, light weight was the prime consideration. The new cable resulted in a reduction of one-half in bulk and one-third in weight over conventional cables, enabling one man to handle a 100-ft. length that previously required the services of two. Changes in electrical setups were facilitated, and movement of portable equipment in the busy backstage area was accomplished with greater ease.

In the new cables, the vinyl insulation-jacket is extruded over the conductors, forming an insulation for the individual conductors and a jacket for the cable all at once. The old method involved insulating each conductor, twisting them into a round core with fillers, and applying an outer protective jacket. The simplified production method used with vinyl permits the cable, made with higher-cost, high-performance materials, to compete costwise with any of the conventional cables.

The success of the Radio City installation now makes this type of cable a vigorous contender for television, film studio, and other theatrical lighting.

The coal mine story

Although the vinyl cables have met the necessary safety specifications for use in Radio City Music Hall, they are not subject to par-

ticularly severe abuse there; it will take years to draw comparisons between the ultimate service life of the conventional cables and the new. But if evidence gathered from coal mine experience is any criterion, they can be expected to serve well for a long time.

The vinyl-insulated cables for mine use have made an outstanding record for themselves:

1) The serious problem of cable fires has reportedly been completely eliminated.

2) Pittsburgh Coal's experience with 25,200 ft. of vinyl cable over a period of more than a year indicates an increase of at least one-third in coal production per cable! At this point, at least 500 cables are in use in dozens of mines and it is expected that the PVC cables will outmode conventional cables within a few years.

PVC mine cable, when subjected to the Bureau of Mines standard flame test, passed satisfactorily, with flame-extinction occurring within a few seconds, since it has no components which will support combustion.

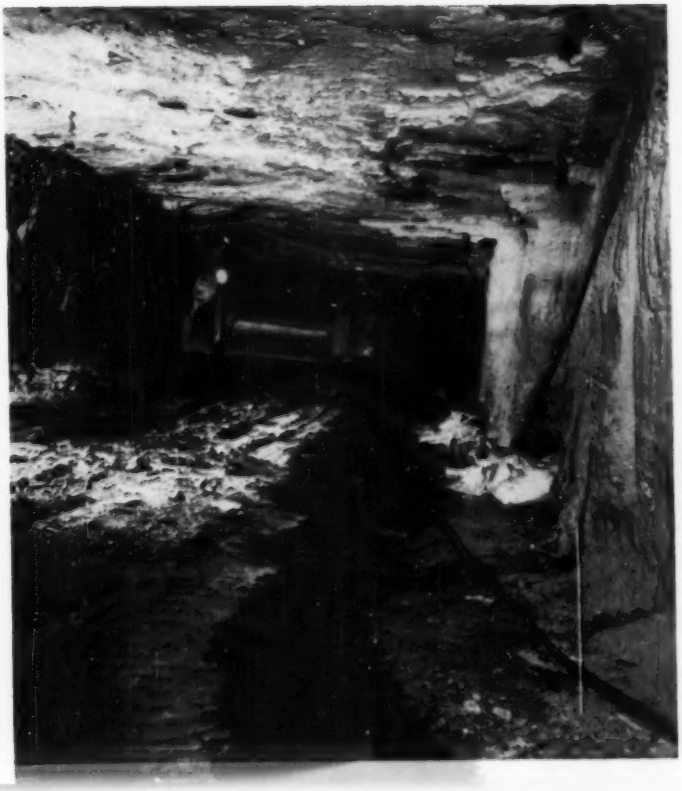
With typical mine cables of conventional construction, a single short circuit will readily ignite the highly combustible rubber insulation, and encourage the persistance of the short circuit arc which will progress steadily along the cable toward the power source. The intense heat of the arc and the burning rubber decomposes most of the neoprene jacket, adding toxic fumes to the large volume of rubber smoke. This performance is typical of mine cable fires that occur with conventional cables.

Because of the noncombustible nature of the PVC cable, it was necessary, during tests, to deliberately short circuit the conductors from 13 to 17 times before an even very limited amount of smoke was given off. Thus, even under atypically severe conditions, the vinyl cable presents no serious fire or smoke hazards.

Cables that feed mining machines and provide power essential to the efficient operation of the machines must necessarily meet rugged physical specifications. In tests conducted for the Bureau of Mines, lengths of cable with vinyl insulation-jacket were subjected to runovers by cars in a freight train. Results reported by Pittsburgh Coal state that the vinyl cable, although slightly damaged, was still usable; the conventional cable was ruined.—End

tough jobs

Whether for stage lighting or mine service, PVC-jacketed cable stands up under rugged conditions. Light weight brings cost savings



PVC TRAILING MINE CABLES, here shown attached to a shuttle car in coal mine, test the same material under extreme conditions of abuse. Note flatness and flexibility of design which allows easier handling.

Plastics in the product revolution:

STYRENE-ACRYLONITRILE housing of Ronson shaver represents the first and, to-date, only use of a thermoplastic material for this application.

When Colonel Schick introduced the first electric shaver in 1930, the product came in a phenolic housing and contained a number of internal plastics parts. Since that time, the close association of electric shavers and plastics has never been seriously challenged, although there were abortive efforts in the middle 30's to use brass and mahogany for housings. Today, all electric shavers are housed in plastics cases and contain numerous plastic parts.

In 1932, 10,000 progressive males bought the new shaving device. By the end of 1959, electric shavers were rolling along at an impressive 7-million-per-year clip, representing a retail value of about $140 million.

Schick had a monopoly on these shavers for four years. Then, starting in 1934, other companies began to enter the field until there were as many as 40. By 1960, because of patent situations, this number had shrunk back to 19.

Like Schick, early competitors (e.g., Hanley Clipshave, Packard Lektra Shaver, etc.) also used phenolic for their housings. This practice continued until 1940, when the commercial availability of amino resins brought about a switch in the housing material. In that year, Raymond Loewy redesigned the Schick shaver in urea, which was later superseded by melamine. The material provided the eye appeal as well as the physical characteristics to make it well suited for this application. As a matter of fact, manufacturers were so satisfied with it that all major brands (with one notable exception) still use melamine housings. Some use methacrylate trim.

The one exception is Ronson, which uses an injection molded styrene-acrylonitrile copolymer case. Ronson entered the field in 1954 and had at that time at its disposal the fruits of years of plastics development. Without a tradition of thermoset housings and without investment in thermoset tooling, the company chose the thermoplastic as the most suitable housing material. According to Ronson engineers, styrene-acrylonitrile copolymer has good dielectric values, pleasant feel, adequate heat resistance, good moldability, high molded-in finish, and good resistance to breaking if accidentally dropped. Its weight is about 1½ ounces. An important plus is the fact that, according to Ronson, the material permits fine detail in design.

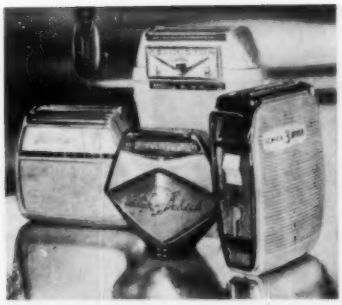
The star emblem on the cover is a second-surface decorated with acrylate molding, mechanically fastened to the housing.

Shaver components other than the housing are made of a variety of plastic materials. These applications are generally standard uses found in many other motorized appliances.

Merchandising is an extremely important aspect of electric shaver success, and the package, therefore, assumes great significance. Here again, plastics have contributed a great deal. While manufacturers differ in their approach, perhaps none has been as ingenious as Ronson in extensive plastics usage.

This display case is molded of high-impact polystyrene, decorated with metallized Mylar on the cover. The shaver itself is seated in a vacuum formed, flocked and contoured polystyrene insert. A polystyrene clip holds the PVC line cord. All in all, the Ronson shaver and case consume approximately 6½ oz. of vari-

ELECTRIC SHAVERS



THE COVER: From the simple, phenolic housed shaver of 30 years ago, extensive usage of variety of plastics has resulted in highly decorative and efficient instrument of today.

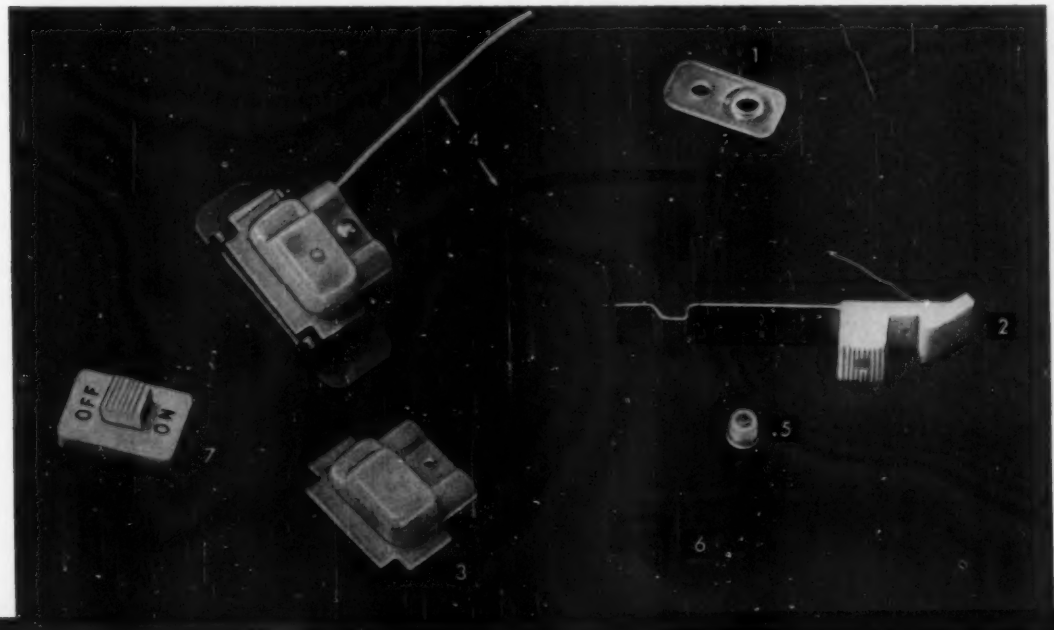
Part	*Material*
Display case bottom and cover	High-impact polystyrene
Display case crystal	Butyrate
Cover insert	Laminated Mylar film
Display case nest	Vacuum formed, flocked polystyrene
Inner cutter bearing	Nylon—Zytel 101
Slide switch lever	Nylon—Zytel 101
Slide switch barrier	Nylon—Zytel 101
Drive pin sleeve	Nylon—Zytel 101
Head latch	Nylon—Zytel 101
Inner cutter guide	Nylon—Zytel 101
Oscillating thrust washers	Nylon—Zytel 101
Housing	Styrene-acrylonitrile copolymer
Cover	Methyl methacrylate
Line cord	Polyvinyl chloride
Terminal plate	Phenolic-paper laminate
Cord clip	High-impact polystyrene
Oscillator	Wood-flour-filled phenolic
Protecting head cap	Methyl methacrylate
Hair stopper	Polyurethane
Brush	Cellulose acetate

ous plastics materials. The complete catalog of plastics parts used in the Ronson shaver is shown in the table at left.

This list is impressive testimony to the design versatility of plastics in this application—and each material was carefully selected to do its particular job. It suggests that without plastics this relatively young product may never have reached the success it is now enjoying.

Very little market data are available on electric shavers and few will venture a guess as to their future. But with roughly 65 million male shavers, and tens of millions of women, the growth potential is there. Based on past experience, plastics usages will grow as the market expands. For from the standpoint of both operation and merchandising, plastics have become indispensable materials in the product revolution that is so well represented by the electric shaver.—**End**

SOME OF THE INTERNAL COMPONENTS of the Ronson men's shaver. **1**—inner cutter bearing; **2**—head latch; **3**—switch barrier; **4**—wire jacketing; **5**—sleeve bushing; **6**—inner cutter guide hook; and **7**—slide switch. All parts are of Zytel 101 nylon.



'17,'18 in a series

EVERYBODY NEEDS EPOXIES

ABRASIVE EPOXY formulation shot-blasted over steel plates provides non-skid strips on ramp in Pittsburgh, Pa. Previously, many accidents were caused when wooden structure became slick.

Safe roads that last

By Robert N. Williams*

Long service life and improved safety are the two major contributions epoxies bring to road construction. In this application the dual-purpose of the resin is to render concrete road surfaces waterproof and skid-resistant. Long-term testing by resin suppliers and formulators has confirmed that epoxy coatings, if properly cured, perform so well on highways and bridges that the higher cost of road building is fully offset by savings in repairs. Indirect savings resulting from reduced driving hazards on epoxy-surfaced roads are incalculable. Epoxy road surfaces are impervious to water, de-icing salts, and freeze-thaw cycles. They are highly resistant to oils and other solvents, and possess good wearing properties.

The typical resin system now used is a two-component material consisting of the epoxy resin and the catalyst, diethylenetriamine. The components are mixed in equal parts in any quantity up to 5 gallons. At 75° F. a typical coating cures in about 2 hr., and may be subjected to traffic after 6 hours. Higher temperatures mean correspondingly faster cure rates. Below 60° F. a typical formulation cures so slowly that it is not recommended. A liquid road surface coating may be mixed with sand to form a thick "mortar" which is excellent for repairing pot-holes.

Because the bonding strength of the epoxy compound is greatly diminished when a concrete surface is oily or damp, the road must first be swept clean of dirt and all loose material. It is then sprayed with diluted muriatic acid, thoroughly washed, and allowed to dry. The coating can then be applied with brooms and squeegees if small areas are involved; or by using a special truck for larger road surfaces.

* Director of Research, Reliance Steel Products Co., McKeesport, Pa.

The truck is designed for proportioning, mixing, and spraying the epoxy coating onto the road surface to an average thickness of 1/16 inch. A grit spreader follows the truck and applies an even ribbon of abrasive about ½ in. deep. Sand or emery may be used as abrasives, but for maximum skid resistance, a mixture of 6-20 mesh aluminum oxide has been found to be most effective.

This procedure has been found particularly effective for airport runways.

Besides their use as a binder for abrasives, these coatings are used because they provide excellent protection of road surfaces. The prevention of water and salt damage alone eliminates the necessity of expensive maintenance for many years. The cost of typical epoxy compounds for this application is usually between 50¢ to $1 per square foot.

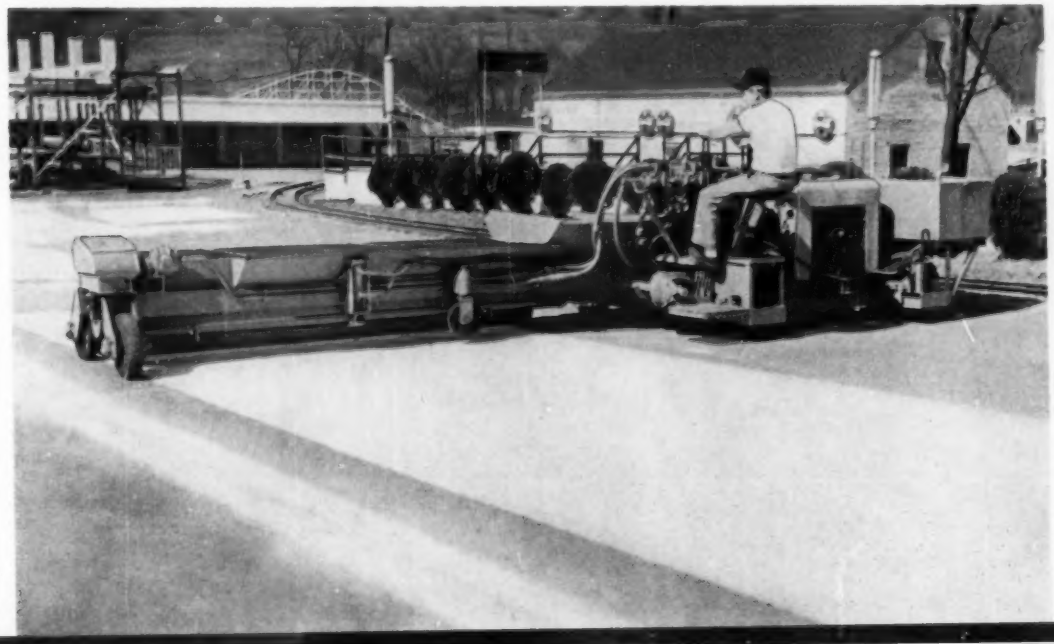
A representative application is the Duquesne Ramp in Pittsburgh, Pa. This ramp was originally installed as a temporary wooden structure. The curvature radius of the ramp is 203 ft., and the curve portion near the top is a 5% grade. The straight portion of the ramp is a 6.3% grade. The accident rate on this trestle has been quite high, especially on the curved portion, and particularly in rainy weather because the wooden deck, which has absorbed oil over the years, becomes very slick and dangerous when the oil mixes and floats with rain water. The Pennsylvania State Highway Department ordered 170 steel plates 3 by 10 ft. by 3/8 in., coated with an abrasive epoxy formulation developed by Reliance Steel Products Co. The plates were shot-blasted and coated with coarse No. 12 emery. Since their installation, no accidents have been reported on the portion of the ramp using these non-skid plates.

Another application was the waterproofing of Bridge Route 128 over the Charles River at Dedham, Mass. Here the epoxy formulation was applied directly over the concrete surface of the bridge in order to provide a waterproof membrane for a subsequent 2-in. layer of asphalt which was to be applied over the surface several weeks later. Because it was felt that traffic might skid on the slick surface of the resin, several truckloads of limestone chip—less than ½ in. in size—were sprinkled over the surface prior to cure of the resin coat. After two weeks of traffic, no appreciable amount of stone had been worn or loosened from the surface of the road. The film holding the stone chip was only 1/16 in. thick.

The versatility of these formulations has given rise to several new associated products. The basic formulation is used as an abrasive binder for non-slip coatings on steel, such as ladder rungs, stair treads, and manhole covers.

Although conventional road surfacing materials are quite cheap by comparison with epoxies, the advantages realized from the latter seem well worth the additional cost. These materials, properly formulated to give maximum performance at lowest possible cost, may well bring a new dimension to highway maintenance and safety.—**End**

RIBBON of abrasive material is layed over uncured epoxy resin by grit spreader. This is the final step after concrete had been swept, washed, and sprayed with coating about 1/16-in. thick.



EPOXIES

Tops in floor topping

By W. A. Severance*

The sensitivity of concrete to even the mildest of chemicals has led to the development of a series of epoxy "monolithic" toppings and linings, applied by trowel to concrete floors in layers ranging from 1/16 to 3/8 in. in thickness. Monolithic refers to concrete structures that are cast as single pieces.

Epoxy-based monolithics generally have more than enough chemical resistance for most flooring applications. At the present time, however, there is no single compound or system that will suit all chemical conditions. Research by manufacturers of corrosionproof materials indicates that modification of basic epoxy formulations is necessary in most cases.

The monolithics are generally characterized by physical and chemical properties far exceeding those of concrete in a number of important respects, including load-bearing ability, chemical resistance, abrasion resistance, tensile strength, and adhesion to cured concrete.

Typical physical properties of a monolithic topping, compared with concrete, are shown in the accompanying table.

These properties, combined with outstanding chemical resistance, suggest such uses as floors in warehouses; in metal plating and pickling areas; in chemical plants manufacturing fertilizers, pharmaceuticals, acids, chlorine, solvents, etc.; linings in concrete tanks for storage and processing of industrial wastes; for concrete chimneys; and linings for concrete sewer installations.

The key to the successful performance of monolithic is encompassed by three basic principles, as follows:

1) Correct formulation to minimize the hazards that are encountered during application as well as the destructive forces—both physi-

* Tech. Dir., The Ceilcote Co. Inc., Cleveland, Ohio.

Photos, Ciba Products Corp.

SIMPLE TROWELING operation is all that is necessary to apply epoxy topcoat to concrete floor.

cal and chemical—which act on the topping while it is in service.

2) Correct engineering to design the base, specify construction details, and to prevent the topping from being used in environments detrimental to its service life.

3) Correct installation to assure proper surface preparation and attention to detail necessary for complete corrosion protection.

But the user's best assurance of satisfactory results is to deal with a supplier offering both formulation and application experience.

Compounding

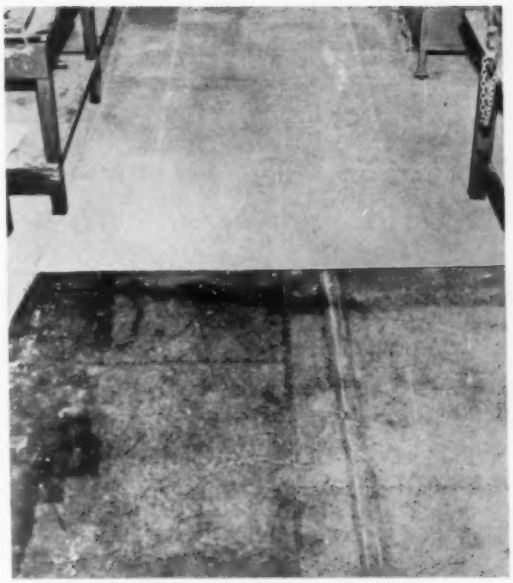
Depending upon their end use, the epoxy resins may be compounded with modifiers to achieve plasticity, improve workability, or to lower cost. The modified resins are mixed immediately before use with hardeners and various types of inert fillers. Silica and carbon are the two basic types of fillers that are commonly used as such fillers.

It is important that fillers be properly graded as to particle size to assure maximum workability and strength. Their function is to build lining thickness, lower shrinkage of the resins, reduce the coefficient of thermal expansion, provide impact and abrasion resistance, and decrease cost.

The effects of shrinkage must be minimized by compounding with resin modifiers, fillers, and possibly by reinforcing with fibrous glass or steel. Modification of the resin generally sacrifices chemical or heat resistance. If conditions require a maximum in these properties, compounding must be limited to fillers and/or reinforcing agents. Epoxy resins offer the obvious advantage here of requiring far less compounding work.

Epoxy monolithic toppings provide good resistance to the physical abuse of trucking and other industrial traffic when applied in thicknesses of ¼ in. or more. Some toppings possess several times the abrasion resistance of concrete or brick. Toppings thinner than ¼ in. are susceptible to impact damage and subsequent chemical damage resulting from the destruction of the bond.

The largest single factor in the success or failure of a monolithic topping or lining is the condition of the concrete itself. Disregard for engineering details may result in the localized failure of the monolithic. Generally speaking, engineering details are of particular importance where materials of differing expansion coefficients meet to require special attention, such as is the case when sealing in drains, joining floors with trenches, sealing legs of tanks, pumps, and similar items as well as joining floors with brick piers and bases.

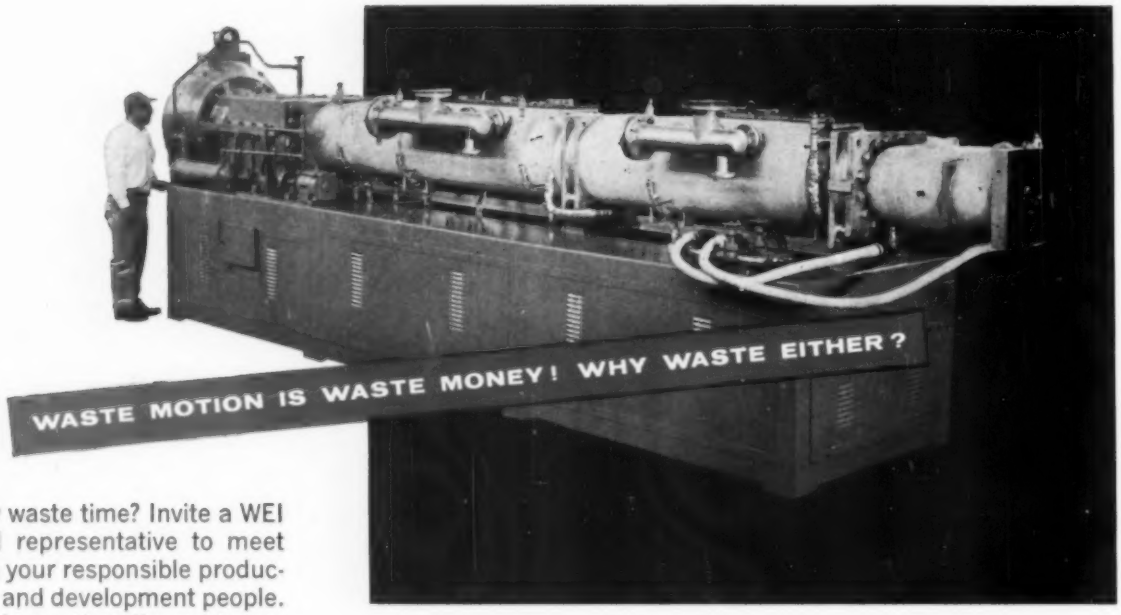


CLOSE-UP OF SECTION of industrial flooring, before (foreground) and after application of epoxy topping. Epoxy provides high chemical and abrasion resistance to floor.

Monolithic toppings are not a new concept in corrosion engineering. Numerous organic and inorganic substances have been used previously and asphalt, for example, has met with considerable success. Each type has its own disadvantages, and plastics monolithics are no exception. However epoxies come closest to being the ultimate in concrete protection of any of the materials available to date.—End

Properties of epoxy monolithics and concrete

PROPERTY	MONOLITHICS	CONCRETE
Tensile strength, p.s.i.	1,600	500
Compressive strength, p.s.i.	10,000	3,000
Flexural strength, p.s.i.	1,000	
Water absorption, %	0.3	25
Coefficient of thermal expansion, in./in./°F.	0.000012	0.0000065



Why waste time? Invite a WEI field representative to meet with your responsible production and development people. We know that the vast majority of front line thermoplastics engineers recognize the importance of consolidating labor costs and power and space requirements of their major compounding-devolatilizing-extruding equipment. This is the perfect time for the unique WEI dual worm design to step boldly into the picture. Invitations are extended in two important directions: to tackle the production problems with new, more demanding materials, to turn old-idea multiple machine systems into the discard for space-saving, controlled quality WEI all-in-one-operation custom-fitted dual worm equipment. It's a sure-footed step that is translated worldwide into leadership production . . . production with labor-saving, power-saving, space-saving profit arguments make sense to a long and growing list of world leaders in the plastics manufacturing business. We treat all inquiries and all service in the strictest confidence.

Welding Engineers *Improved-Profit* All-In-One-Operation Compounder-devolatilizer-extruders are designed to operate at maximum capacity and cut your labor requirements in half!

WELDING ENGINEERS, INC., NORRISTOWN, PA.
MANUFACTURERS OF PROCESSING EQUIPMENT
FOR THE CHEMICAL INDUSTRY
W
WELDING ENGINEERS
E
U.S. West Coast Sales Representatives: Machinery Sales Co., Los Angeles 58, Cal.
European Sales Representatives: Welding Engineers Ltd., Geneva, Switzerland
Far East Sales Representatives: Marubeni Iida Co., Ltd., Tokyo, Japan

sile strength in p.s.i., and tear

George R. Smoluk, Engineering Editor

PLASTICS ENGINEERING

PROCESSING • FABRICATION • PRODUCT DESIGN • TOOL AND EQUIPMENT DESIGN

One-shot urethane foam

By W. E. Erner†, A. Farkas†, and P. W. Hill†

Although the majority of plastic product manufacturers have a good knowledge of polymer chemistry, many find it only of incidental use in everyday production problems. Not so with the polyurethane foam producer where success is heavily dependent on the formulating and mixing technology involved in combining basic monomeric chemicals to form a foam. The following article describes a special urethane foam catalyst that has significantly altered the production of foams by eliminating a production step from the customarily used foam process. In the development work reported here, the foam manufacturer will find a discussion of the variables to be considered and the techniques to be used in adapting this new catalyst to his own particular foam production equipment. Types of foams that can be produced by this new one-shot process are analyzed.

Flexible polyether urethane foams are generally produced in two steps. The first step consists of the preparation of a liquid prepolymer (5, 8)[1] of intermediate molecular weight. Then, in a second step, urethane foam of high molecular weight is formed. Elimination of the intermediate step, obviously presents various economic as well as technical advantages.

In the past, the low viscosities and low reactivities of polyethers relative to those of adipate polyesters have excluded these materials from the simple "one-shot" foaming techniques that are used with the polyesters.

Now, one-shot polyether foaming processes have been developed; and one such is described here. The high catalytic activity of triethylenediamine was used to accelerate the polymerization reaction of polyethers with diisocyanates sufficiently to make foams. Such foams can be made by varying the formulation, foaming techniques, and raw materials.

*Reg. U. S. Pat. Off.
†Houdry Process Corp., Marcus Hook, Pa.
[1]Numbers in parentheses link to references at end of article.

Adapted from a paper presented at the Atlantic City Meeting of the Division of Paint, Plastics and Printing Ink Chemistry, American Chemical Society, in September 1959.

Experimental procedures

The following raw materials were used in this study:

TDI, a commercial mixture of 80% of 2, 4- and 20% of 2, 6-tolylene diisocyanates.[2]

PPG-2025, polypropylene glycol of a molecular weight of 2025.[3]

LG-56, and LHT-67, triols derived from trifuncational polyols by the addition of propylene oxide.[3]

Triethylenediamine $N(C_2H_4)_3N$, also known as 1,4-diazabicyclo-(2.2.2)-octane, DABCO grade (minimum purity 95%).[4]

X-520, a water soluble silicone.[3]

When hand mixes were used, they were prepared in 1-qt. ice cream cartons or paint cans and poured into corrugated cardboard boxes for foaming. Mixing was done with a Dormeyer mixer that is equipped with a 4-

[2]Mobay Chemical Co.
[3]Union Carbide Chemicals Co.
[4]Houdry Process Corp.

Table I: One-shot polyether foams, hand-mixing procedure a)

Basis: 300 g. PPG + 110 g. TDI

Cure: 3 hr. at 250°F. and ambient humidity

Run No.	1	2	3	4	5	6
Water, g.	7.4	7.4	7.4	7.5	7.5	7.5
Triethylenediamine, g.	1.75	1.75	1.75	1.8	1.8	1.8
X-520, g.	1.75	1.75	1.75	1.8	1.8	1.8
1st stage mixing, rate r.p.m.	500	700	500	900	500	500
1st stage mixing, time, sec.	60	7.5	90	10	10	4500
2nd stage mixing, rate r.p.m.	900	900	900	900	900	900
2nd stage mixing, time, sec.	10	10	8.5	5	7	7
Cream time, sec.	—	—	—	4	8	—
Rise time, sec.	—	—	—	50	56	*
Density, lb./ft.^{3}	2.55	2.52	2.59	2.86	2.45	
Tensile strength, p.s.i.	14.1	18.4	12.5	16.6	17.0	
Tear resistance, lb./in.	3.45	4.0	4.05	3.63	4.5	
Compression load deflection at 25%, p.s.i.	0.46	0.41	0.44	0.50	0.45	
Compression set, %	8.5	7.2	8.0	8.7	7.1	

*Deliberately over-mixed. Foam rose quickly and collapsed.

Table II: One-shot polyether foams, hand-mixing procedure b)

Basis: 300 g. + 110 g. TDI

Cure: 3 hr. at 250°F. and ambient humidity

Run No.	7	8	9	10
Water, g.	7.5	7.5	7.5	8.7
Triethylenediamine, g.	1.8	1.8	1.8	2.1
X-520, g.	1.8	1.8	1.8	2.1
Mixing rate, r.p.m.	900	900	900	900
Mixing time, sec.	7	10	13	12
Cream time, sec.	19	26	21	12
Rise time, sec.	83	90	85	77
Density, lb./ft.³	3.06	2.65	2.49	—
Tensile strength, p.s.i.	15.3	12.9	14	*
Tear resistance, lb./in.	3.0	4.50	3.8	
Compression load deflection at 25%, p.s.i.	0.47	0.48	—	
Compression set, %	8	8.9	8.7	

*Foam was friable and brittle.

bladed propeller stirrer of 2-in. diameter and 30° blade pitch, operating at 500 to 900 r.p.m. The polyethers and the diisocyanate were dispensed from 2-l. separatory funnels. Activator solutions were dispensed from a 50-cc. volumetric burette. Mixing operations were stopwatch-timed.

A Bayer-Hennecke foam machine (7) was used to produce machine-mixed foams. The original "Christmas Tree" stirrer was replaced by a turbine impeller, made by welding a flat piece of steel to a stirrer shaft and twisting it through an arc of 180° on the vertical axis. In order to reduce atomization of the feed streams, the relief springs in the Bosch injector nozzles were replaced with 60 p.s.i.g. springs. The belt drive was modified to permit stirring speeds in the range of 650 to 2000 r.p.m.

In most runs, the activator stream was divided into two portions. All of the triethylenediamine and part of the water were injected at the top of the mixing cylinder. The balance of the water and the silicone was injected in the middle of the mixing cylinder (B) in Fig. 2.

Table III: Effect of hand-mix methods on foam properties

	Procedure	
	a)	b)
Number of samples	6	9
Tensile strength, p.s.i.	13.4	14.3
Compression set, %	8.8	9.1

Test methods

Standard test methods for flexible foams approved by the Cellular Plastics Division of the Society of Plastics Industry (6) were used. Compression-deflection is p.s.i. at 25% deflection, tensile strength in p.s.i., and tear strength in lb./in. were determined on a Dillon multi-low range testing machine. Samples for compression-deflection, tear, and tensile testing were die-cut with a Thwing-Albert Alpha cutter. Accelerated humid aging was conducted in a #1642-B Burpee autoclave. The samples were evaluated for 1 to 3 hr. at 250° F. and ambient humidity.

Hand-mix results

By close control of the mixing rate and time of mixing of the ingredients, one-shot polyether foams of satisfactory physical properties were prepared by hand mixing in a reproducible manner. The activator used consisted of 67.5% water, 16.25% triethylenediamine, and 16.25% of silicone X-520. The usual batch size was 300 g. of polyether, 110 g. of toluene diisocyanate, and 11 g. of activator. Two procedures for mixing the ingredients were used:

a) In one method, the activator solution was added to the polyether and stirred at a certain speed for a certain length of time. Then the toluene diisocyanate was added and stirring completed.

b) In a second method, the activator solution and the toluene diisocyanate were added successively, and the mixture stirred.

The mix, usually a rather clear

Table IV: One-shot polyether foams; effect of diol:triol ratio; hand-mixing procedure b)

Cure: 3 hr. at 250°F. and ambient humidity

Run No.	11	12	13	14	15
PPG, g.	250	200	150	150	100
LHT-67, g.	50	100	150	150	200
TDI, g.	110	110	110	110	110
Water, g.	7.5	7.5	7.5	7.9	7.9
Triethylenediamine, g.	1.75	1.75	1.75	1.36	1.36
X-520, g.	1.75	1.75	1.75	1.94	1.94
Mixing rate, r.p.m.	900	900	900	900	900
Mixing time, sec.	10	10	10	10	10
Cream time, sec.	18	19	18	18	18
Rise time, sec.	81	86	78	82	85
Density, lb./ft.³	2.40	2.43	2.61	2.25	2.20
Tensile strength, p.s.i.	15.6	13.4	13.4	12.5	11.7
Tear resistance, lb./in.	4.0	3.37	2.75	3.80	2.40
Compression load deflection at 25%, p.s.i.	0.40	0.37	0.38	0.43	0.43
Compression set, %	7.2	7.7	8.0	4.6	4.7

liquid of low viscosity, was then poured into a 12-in. deep, 10- by 12-in. cardboard box. The inception of "creaming," i.e., appearance of milkiness in the clear mix, and the completion of foaming was recorded as "cream time" and "rise time" counted from the start of mixing in the toluene diisocyanate. The foam usually filled the box to a height of 4 to 6 inches.

In Tables I and II, p. 107 and p. 108, the proportions of the ingredients used, the mixing procedure (a or b), mix, cream, and rise times, and the appearance of the foam are recorded. Also listed are physical properties for some of the foams cured at 250° F. for 3 hr. at ambient humidity.

As far as the appearance and stability of the foams were concerned, the mixing time and rate appear to be of critical importance. In runs 1 to 5 of Table I, a general decrease in tensile strength was noted with an increasing amount of mixing in the first stage. Excessive mixing, as in Run #6, caused the resultant foam to collapse. Conditions of mixing had little effect on the compression load deflection or compression set of the foams.

Less variation in mixing time was possible with mixing procedure b). However, cream time and rise time were considerably longer than with method a) (Table II). The foams produced in Runs 7 to 9 were more uniform in physical properties. In Run 10, excess water in the formulation gave a friable and brittle foam.

While it is not fully clear why over-mixing adversely affects the stability of the foam, it is believed that the aqueous activator phase has to be subdivided to a certain particle size, and/or in a certain manner, in the non-aqueous phase consisting of polyether and toluene diisocyanate. It is very likely that there is an optimum drop size for maximum stability of the foam, that a certain type of micellar structure is necessary for good foam stability and that this micellar structure is destroyed or impaired by overmixing.

Mixing procedure a) gave smaller cells and lower cream and rise times than did mixing procedure b). No striking differences in the physical properties of foams prepared by the two procedures were noted as shown by the average values that are presented in Table III, p. 108.

Foams were produced from various proportions of diol and triol (LHT-67) to determine the effect of triol upon the physical properties of foams produced in this way (Table IV, p. 108). Very little difference in tensile strength, compression set and other properties was noted up to 50% triol. (Runs 11 to 13). The higher proportions of triol required less catalyst. In two runs, #14 and #15, a significant decrease in compression set was obtained by decreasing the catalyst concentration. The diol-triol combinations tend to give more uniform foams than does straight diol.

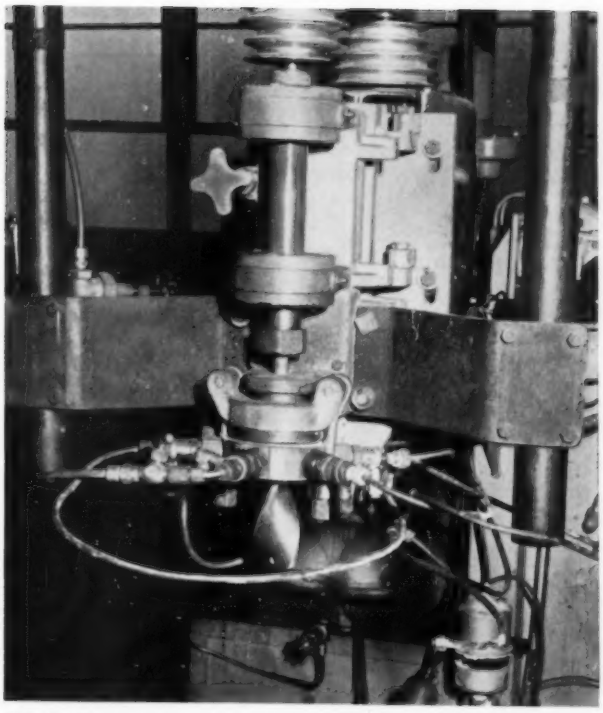


FIG. 1: Close-up of mixing end of foaming machine. Mixing chamber has been removed to show the agitator that has been substituted for the conventional "Xmas tree" stirrer.

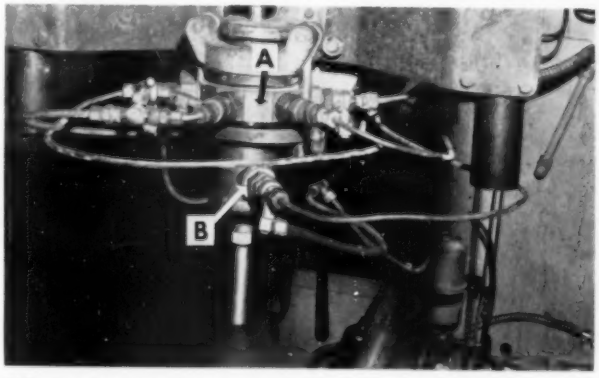


FIG. 2: Piping of feed streams. All of the triethylenediamine and part of water were injected into upper portion of mixing chamber (**A**). Balance of water and other ingredients were fed into middle of the mixing chamber (**B**).

Machine mix results

Using the foam machine equipped with its original mixer blades, attempts to prepare one-shot foams according to the for-

Table V: Formulation and physical properties of polyurethane foams; machine-mix technique

Run No.	1002-SC						1010-SC					
Sample No.	3	4	5	6	13	Avg.	1	2	5	Avg.	3	4
Formulation												
Polyether PPG-2025	71						71					
LG-56	29						29					
TDI	37						37					
Water	2.76						2.98					
X-520	1.0						.49					
DABCO	.58						.58					
RPM	650						2000					
Nozzle, mm.	12						20					
	Short						Long					
Streams												
A_1 (Btm.) H_2O	1.44						1.65					
X-520	1.0						.49					
A_2 (Top) H_2O	1.32						1.33					
DABCO	.58						.58					
Cure	A[a]						B[b]	B	B		A	A
Density, lb./cu./ft.	2.4	2.33	2.46	2.53	2.59	2.46	2.15	2.08	2.10	2.11	2.10	2.04
Tensile strength, p.s.i.	17.9	18.3	14.8	16.9	17.4	17.1	16.0	16.2	16.3	16.2	12.3	13.4
Tear resistance, lb./in.	3.80	4.00	3.13	3.53	5.13	3.92	3.45	2.9	3.67	3.34	3.32	3.1
Compression load deflection, 25%, p.s.i.	0.36	0.38	0.33	0.34	0.33	.35	.30	.28	.31	.30	.28	.29
Loss on hydrolytic aging, %	2.0	5.3	−0.1	0.0	5.0	—	13.2	.5	14.8	—	7.9	9.2
Compression set at 50% deflection, % based on original height	11.7	11.9	12.4	11.8	11.2	11.8	9.3	9.8	7.6	.89	7.8	8.0

[a] A = 3 hr. at 250°F. and ambient humidity.
[b] B = 1 hr. at 250°F. and ambient humidity.

mulation used in the hand mixes failed. The foams collapsed after they reached the full height. Since the hand-mixed runs indicated over-mixing as a possible cause for collapse, the original mixer was replaced with the mixer shown in Fig. 1, p. 109, in order to reduce the extent of mixing. Since it appeared that the collapse of the foam was due to the polymerization reaction not being fast enough to provide gel strength to hold the carbon dioxide liberated, it was thought that improved foam might result if the polymerization was given a head start. This was accomplished by the described injection of the triethylenediamine and part of the water at the top of the mixing chamber in Fig. 2.

Table V, above shows the formulation used and the physical properties of the foam obtained at two sets of conditions. It will be recognized that foams of good quality were obtained in each case with satisfactory reproducibility. For Run No. 1010, the effect of curing was examined, and it will be seen that the 1-hr. cure gave results superior to the 3-hr. cure.

Table VI: Alternate conditions used in preparation of machine made forms.

Nozzle size, mm.	6 to 20
length, mm.	12 or 115
Mixer speed, r.p.m.	650 to 5000
X-520 silicone concentration, % based on polyether	0.5 to 1.0
Triethylenediamine concentration, % based on polyether	0.4 to 0.85

Satisfactory foams were also obtained under conditions shown in Table VI, below.

In the course of these studies, foams as high as 30 in. were blown with uniform cell structure from top to bottom. Also, a stick was thrust entirely through one sample many times from the start to the end of the rise. This did not stop or hinder the foaming action.

A limited amount of work was also carried out with systems in which the activator solution was introduced in a single stream. In order to avoid excessive atomization, an 8-in.-long piece of copper tubing was inserted between the atomizing nozzle and the mixing head. A stable foam resulted, but the physical properties of the foams thus obtained were inferior to those made by a double activator system. (Tensile strength, 12 to 13 p.s.i.; tear resistance, 2.3 to 2.7 lb./in.).

Discussion

The present studies on the development of a one-shot polyether foam were initiated **(To page 187)**

PVC 70

A new vinyl dispersion resin for PLASTISOLS and ORGANOSOLS

Exceptional flow properties and viscosity stability provide easier application, wider compounding latitude.

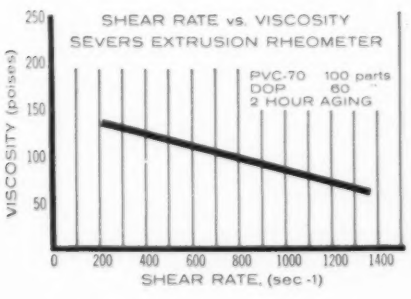
Here is one of the most thoroughly pretested dispersion resins ever put on the market . . . Diamond PVC 70! Over a million pounds were produced as a test—and proof—of superior uniformity. Immediate commercial acceptance has resulted.

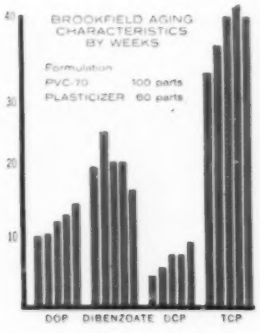
Low viscosities at both high and low shear rates and maintenance of these viscosities upon aging, even at higher than normal temperatures . these are characteristics of plastisols and organosols based on PVC 70. Fewer problems with dilatancy in high-speed coating, fewer viscosity adjustments in recycled plastisols for dipping and molding, fewer hot-weather headaches for custom compounders are all possible with this resin.

Diamond PVC 70! Try it in your own plant, with your own equipment. Experienced sales and technical service personnel are at your service.

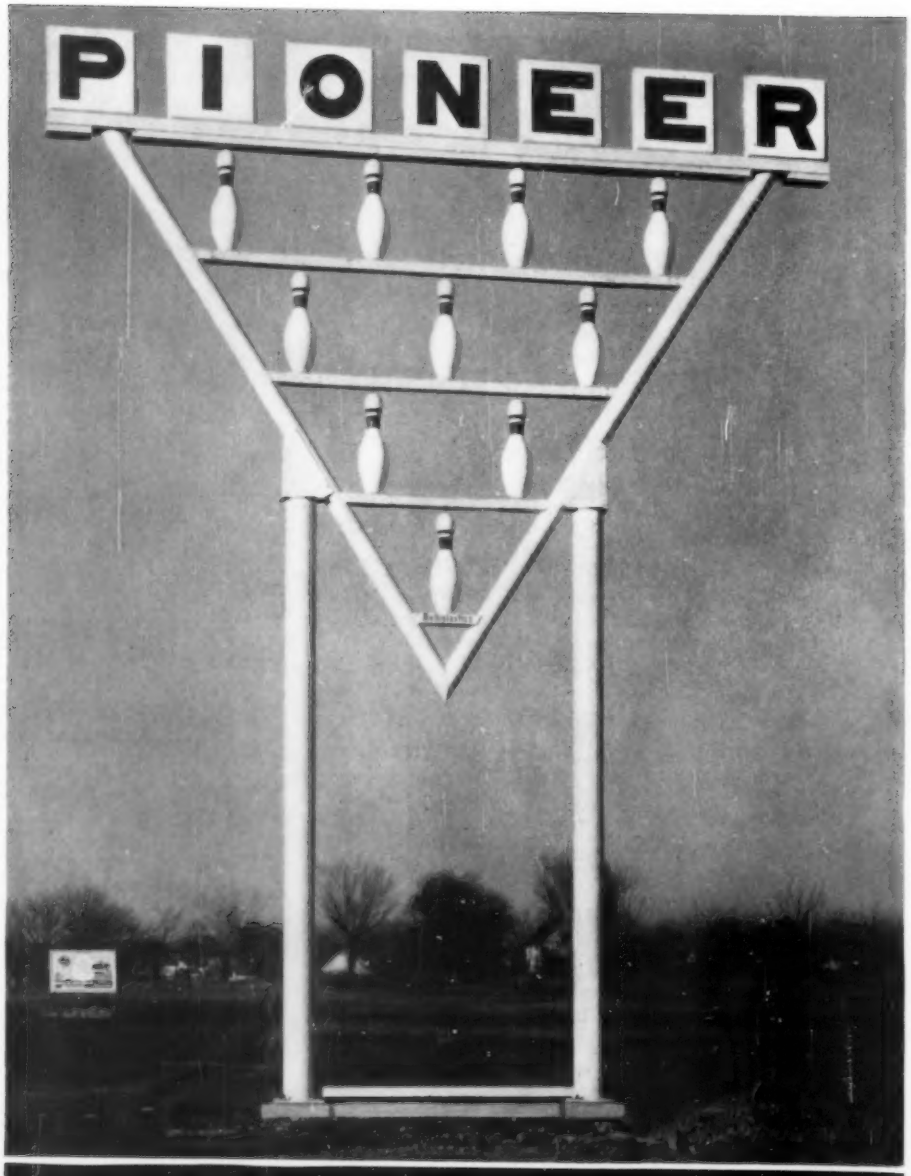
Look to Diamond for new things in Vinyl Dispersion resins!

For complete information, write Diamond Alkali Company, 300 Union Commerce Building, Cleveland 14, Ohio.



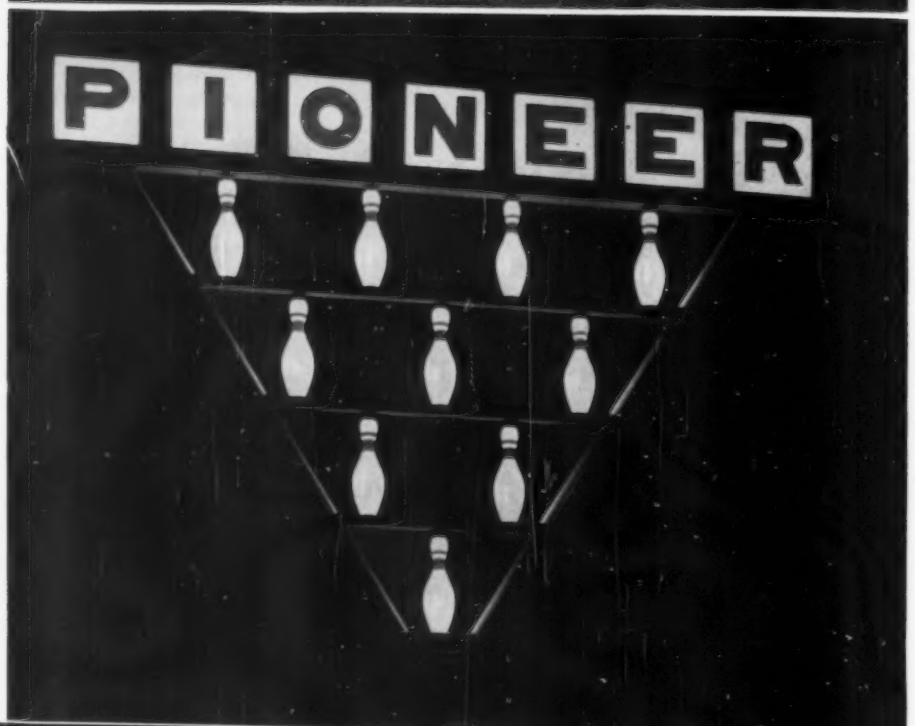


Diamond Chemicals



Attractive by day

For daytime viewing, the highly reflective surface of extruded Butyrate sheet was utilized by choosing transparent sheet, and decorating the pins and letter panels on the interior side after forming. Result: an eye-catching and eye-pleasing display.



Striking at night

At night, Butyrate's excellent light diffusion and light transmission properties give long-distance legibility to the internally-lighted pins and letter panels. This insures immediate identification of Pioneer Lanes from far-off points on the highway.

This sign was designed and manufactured by Multiplastics, Inc., Addison, Illinois, for Pioneer Bowling Lanes, Addison, Illinois. The sign is 37½ feet high and 26 feet wide, including the steel framework. Pins and letter panels were vacuum-formed from sheets of Tenite Butyrate extruded by Midwest Plastic Products Co., Chicago Heights, Illinois.

Sign manufacturers build creative outdoor signs...with BUTYRATE

Sign designers can think imaginatively when planning outdoor signs in Tenite Butyrate plastic.

Using Butyrate sheet stock, sign elements of great detail can be produced on fast-cycle vacuum-forming machines . . . for this Eastman plastic offers the sign industry unmatched formability in a weather-durable plastic. Sharp corners, deep draws, and multi-plane surfaces are easy to obtain.

Pattern and mold costs are remarkably low, thus permitting inexpensive experimentation when this is necessary to work out a satisfactory design. Pressed wood or gypsum cement, for example, often are adequate for custom jobs or for short runs.

The dramatic display for a bowling lane shown at the left is a fine example of how an imaginative spectacular can be produced quickly and economically with Butyrate.

Butyrate offers many advantages as an outdoor sign material

- *Butyrate is "the tough sign plastic." It withstands abuse in fabrication, in shipment, in installation, and in service. Its superior toughness in relation to sheet thickness often permits use of lighter gauges.*
- *Butyrate, in a special weather-resistant formulation, will remain lustrous for many years, even in severe climates.*
- *Butyrate sheet requires no pre-heating in special ovens prior to forming. And after forming, Butyrate cools quickly, so that the molded piece can be withdrawn almost immediately.*
- *Butyrate sheet can be readily cut, sawed, and drilled with no chipping problem.*
- *Butyrate sheet is easy to decorate either by spraying or silk screening.*
- *Butyrate sheet is available in crystal-like clear transparent and popular translucent and opaque sign colors.*

Remember Tenite Butyrate whenever you need a truly weather-durable plastic. Its wide use as signs, oil-field pipe, automobile taillight lenses, marine floats and numerous other applications is your assurance of dependable outdoor service. For more information on the properties and possible usefulness of tough Tenite Butyrate, write EASTMAN CHEMICAL PRODUCTS, INC., subsidiary of Eastman Kodak Company, KINGSPORT, TENNESSEE. In Canada: TORONTO, 164 Eglinton Ave., East. HUdson 7-1197

Vacuum-formed halves of the large bowling pins are easily solvent-welded together.

TENITE®
BUTYRATE
an Eastman plastic

Do-it-yourself polarized light tester

By D. W. Pugh*, W. F. McDonald*, and W. V. Funk**

A simple, easy-to-build, polarized-light tester can be used for two different purposes in the shop or laboratory: 1) It will help the polyethylene injection molder to eliminate internal stresses, and 2) it will enable the polyethylene film maker to check his products for various impurities.

The tester (Fig. 1, below) is a simplified form of polariscope, a well-known device which for many years has been used to observe and measure stresses in plastic parts caused by internal and external strains. The essential parts of the polarized-light tester are two panels of polarizing transparent material. Each is mounted in a horizontal frame so that their polarizing planes are at a 90° angle to each other and at 45° angles to the sides of the frames. A suitable panel size for laboratory use is approximately 21 by 12 inches. The frames are mounted one above the other at a distance of about 6 inches. A frosted-glass plate is mounted underneath the lower panel to diffuse the light from a light source installed below this panel. A suitable light source may consist of two fluorescent tubes. The polyethylene item to be tested is placed on the lower polarized-glass panel so that the light rays can pass through it.

Waves of polarized light vibrate in only one plane perpendicular to the direction of transmission, while ordinary light waves vibrate in all possible planes perpendicular to the direction of propagation. A wheel and axle can be used to depict the difference between unpolarized and polarized light. Unpolarized light vibrates radially in all planes defined by the wheel spokes and the axle, the axle representing the direction of transmission. Light which is plane-polarized is restricted to vibration in one plane described by one wheel spoke and the axle. In a polariscope, such one-plane light oscillation will reveal certain hidden features of a translucent or transparent item which are invisible in ordinary light. It will also show film imperfections more distinctly than has generally been found possible with non-polarized light.

*Polymer Service Laboratories, U. S. Industrial Chemicals Co., Tuscola, Illinois.
**Polyethylene Sales Development Engineer, U. S. Industrial Chemicals Co.

How to detect "locked-in" stresses in molded items

The polarized-light tester may be used to detect interior, "locked-in" stresses in injection-molded polyethylene pieces which are a potential cause of warpage or cracks. Thin sections of unpigmented polyethylene, up to 50 mils, may thus be tested for residual stresses due to machine conditions (especially temperature) or improper mold or part design. In polarized light, such stresses show as alternating light and dark, multi-colored bands called interference fringes. Such fringe patterns give an excellent picture of stress distribution within the tested item. **(To page 116)**

Estimated Cost

of do-it-yourself polarized-light tester

2 Polarized-glass panels	$20
1 Frosted-glass plate	5
2 Fluorescent-light sources	2
Wood for the box	5
Wiring	3
Screws, etc.	1
Labor	20
Total	$56

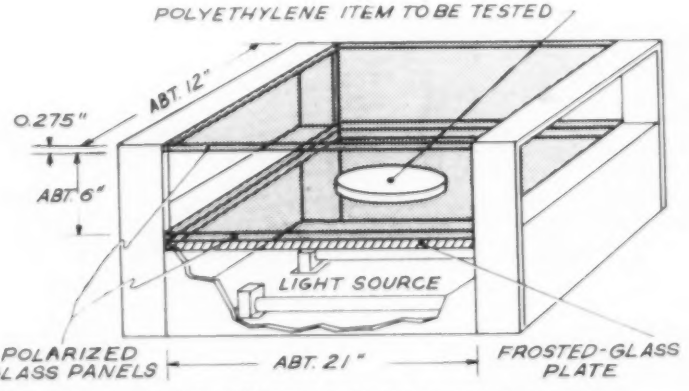


FIG. 1: Diagram of polarized light tester, showing components and their dimensions. Approximate cost is shown in listing at left.

from missile covers to boat cushions

THERMATRON

electronic welding equipment

makes possible the fast, economical, precision welding of any plastic product.

- Tarpaulins of any size • Tents
- U. S. Coast Guard Approved Life Preservers and Boat Cushions
- Boat Navy tops, side curtains, cockpit covers
- Sporting equipment including sleeping bags
- Swimming pool covers and liners
- Air houses and Geodesic structures
- Convertible tops and automotive trims

THERMATRON
ELECTRONICS DIVISION OF WILCOX & GIBBS

THERMATRON—Is the only manufacturer of Electronic Welding Equipment with National sales, services and product engineering. Call the office nearest you.

214 West 39th Street, New York 18, N. Y.

ATLANTA • BOSTON • CHICAGO • DETROIT • LOS ANGELES • NEW YORK • PHILADELPHIA • ST. LOUIS

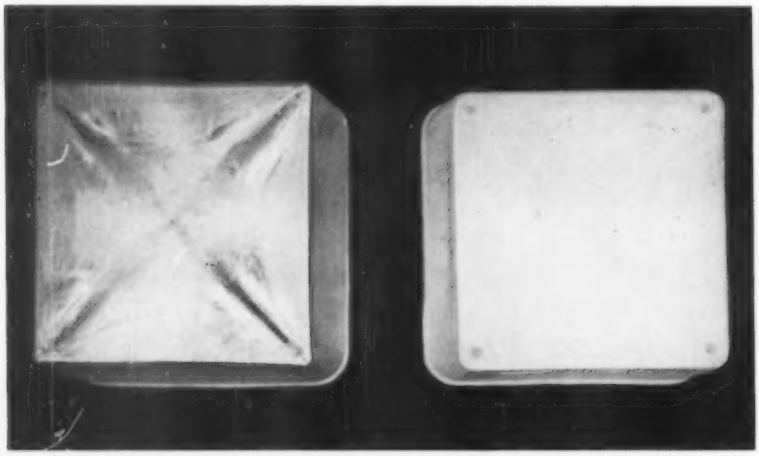


FIG. 2: Two molded polyethylene samples as seen through the polarized-light tester. Item on left shows stresses; item on right is in relaxed state and shows no stresses. Compare pattern in square piece with pattern in round piece shown in Figure 3.

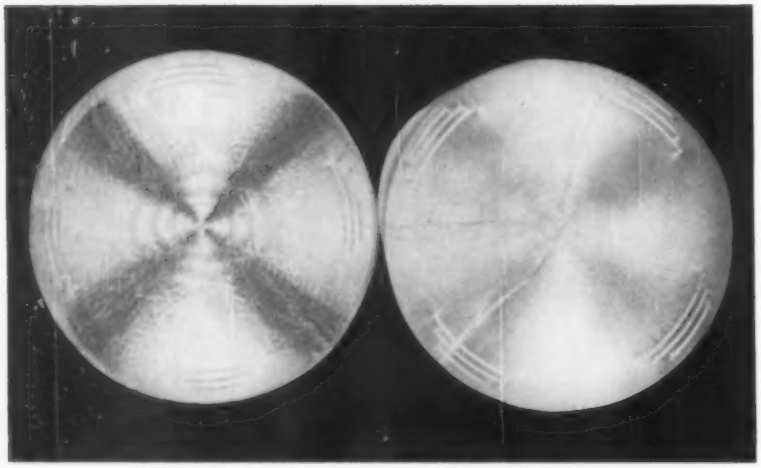


FIG. 3: Two molded polyethylene items in a relaxed state (right) and under stresses (left) as seen in polarized light. Areas of stress are clearly marked even though they are not evident in ordinary light.

For example, pieces produced in a conventional injection mold and tested in the U.S.I. Polymer Service Laboratories showed distinct concentric, jagged, many-colored patterns indicating strong internal stresses. The same parts produced with higher flow temperatures showed soft contours of the fringe pattern, indicating that the item being produced now was practically stress-free (See Figs. 2 and 3, above).

Quick-check setup to obtain optimum processing conditions

The polarized-light tester is an ideal quick-check setup for obtaining optimum machine and temperature conditions for thin-walled injection-molded parts with a minimum of internal stresses. The molder must keep in mind that the optimum cycle with respect to production efficiency, close tolerances, or certain other properties may not be the same cycle necessary to yield stress-free pieces. The simple polariscope test may show him at one glance any dangerous accumulation of stresses. A longer cycle may result in less residual stress, and so may changes in machine and mold conditions—molding and mold temperatures, ram pressure, a valved-gating or sequential mold, etc. If the tester is used after every such change, possibly in conjunction with a photographic camera, and the resulting interference patterns are compared with each other, the optimum conditions for a minimum of "locked-in" stresses will eventually be established. The polarized-light tester can also be used for determining the average number of imperfections in a specified area of polyethylene films of any gage. Some imperfections are visible to the unaided eye; but background grain and "structure" can best be seen in diffuse non-polarized light.

Diffuse non-polarized light has previously been used for determining film imperfections, but in polarized-light, such imperfections are much easier to detect because of the distinct color pattern around each tiny flaw. The eye reacts more quickly to multi-colored spots than to minute differences in shade by which most imperfections show in ordinary light. Consequently, polarized light facilitates and speeds up the counting of irregularities.

Four types of film imperfections are particularly well recognizable with polarized light (See Fig. 4, p. 118) which show film with and without various imperfections in polarized and diffused non-polarized light. These imperfections are:

1) "Fisheyes"—clear spots of

Polyethylene Means Greater Profit!

LOW MOLECULAR WEIGHT

A-C® Polyethylene

FOR FASTER CYCLES

HOW do you get faster operations?

With A-C Polyethylene, faster operations are a *certainty*. Your equipment can be operated at lower pressures and at increased speeds. Melt index is always under perfect control. No release problems even with mirror-finish molds or other time-consuming difficulties with A-C Polyethylene! It all adds up to a faster, more profitable operation.

HOW can you cut down on grades in inventory?

Don't tie up your money! A few virgin resin grades do the work of a wide selection of melt indices. A switch to A-C Polyethylene gives you, at your command, a "tailor-made" resin to fit a particular end part. A simple change of low molecular weight percentages in the dry blending step will give you a wide control of characteristics. Let us demonstrate with a trial run.

for INJECTION MOLDING

Molders who use A-C Polyethylene in their operation gain distinct competitive advantages. Controlled gloss, better color dispersion, and the ability to run larger, more intricate parts and the filling of multi-cavity molds are the definite product advantages. Faster cycle, positive mold release, lower operating temperature and less overall machine maintenance, are the profit-making features contributed by the controlled flow possible with A-C Polyethylene.

for SLUSH MOLDING AND CENTRIFUGAL CASTING

A-C Polyethylene offers an entirely new material for slush molding. With this new polymer you can use less expensive molds; you get faithful mold reproduction with fine detail; and the finished part has a warm, "life-like" feel. Finishes from dull to high gloss are possible. Finished products can be decorated to any specifications.

for FILMS, PLAIN AND COLORED

In the extrusion of polyethylene film, adding A-C Polyethylene can give faster rates at lower extrusion temperatures and make gauge control easier.

For colored film, A-C Polyethylene is invaluable for even, streakless pigment dispersion. Colored films using A-C Polyethylene dispersed color pigments are strikingly brilliant and uniform.

for PLASTIC COATINGS

Coatings containing A-C Polyethylene give a hard, scuff-resistant, glossy surface. Excellent low temperature flexibility and the elimination of blocking problems are added attractions to the converter.

Bread and frozen food wraps are glossy and scuff-resistant.

Shipping cartons are grease resistant and need no liner to protect contents from fibre scratchings.

Butter and frozen food cartons, and bakery cartons are grease resistant and feed as single units to automatic packaging machinery.

SEMET-SOLVAY PETROCHEMICAL DIVISION
Dept. 571-Y, 40 Rector Street
New York 6, N. Y.

National Distribution • Warehousing in Principal Cities

Allied Chemical

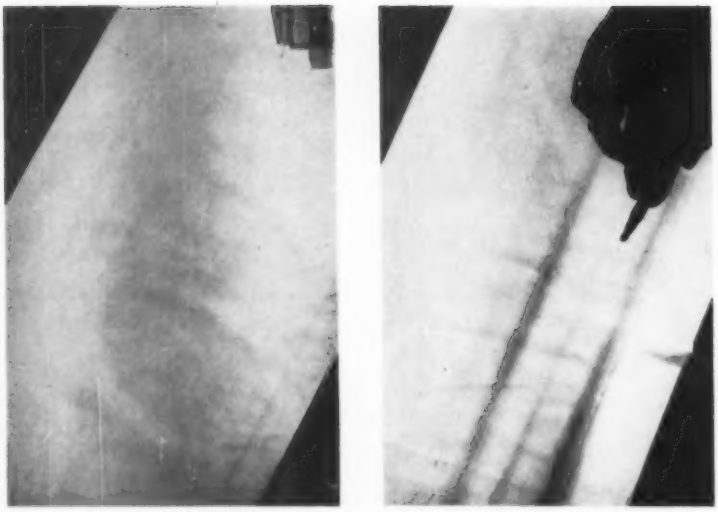


FIG. 4: Two samples of polyethylene film being examined in polarized light tester. Sample at left reveals good clear film. Sample at right has numerous fisheyes and stresses, both of which show up very clearly under polarized light. Although these faults can generally be detected in ordinary light the use of the tester greatly facilitates the inspection operation and helps avoid incidence of errors.

elliptical shape (which may cause tear-offs in unsupported and supported film).

2) Gels—usually symmetrically shaped, optically clear spots.

3) Oxidized particles—yellow-brown specks.

4) Arrowheads—two minute lines intersecting at an angle of less than 180°.

The diversity of the patterns created by polarized light passed through a polyethylene film makes it easy to distinguish the various types of structure irregularities and contaminations. A gel, for instance, shows as irregular lines radiating in all directions.

When the polariscope is to be used for the purpose of identifying and counting film imperfections, it is recommended that a characteristic specimen of each type of imperfection be taped to the frosted-glass plate—preferably next to a color photo of its interference pattern as it shows in the polariscope—for reference. The test method can be used on any type of film—blown, water-quenched, flat, or chill-roll cast.

Routine use of the tester in the U.S.I. Laboratories

Figure 5, right, shows the way the tester is used routinely in the U. S. I. Polymer Service Laboratories. The procedure consists of taking one or more specimens of 1½-mil film made from the resin to be examined, each having an area of about 650 sq. inches. In the case of flat film, 3 pieces, each 36 by 6 in. (equals a total of 648 sq. in.), are slit from each specimen. Blown film specimens are slit down one crease, making separate examination of each side of the lay-flat tube possible. Then two 10-in. lay-flat sections that are 16.2 in. long are slit, resulting in a combined area of 648 square inches.

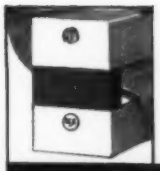
The film specimen, placed on top of the lower panel, is observed from a position such that the eye looks vertically down on it. The type of imperfection is noted and the number of each type counted. Finally, the number of each type irregularity per 50 sq. in. is calculated by the following expression:

Imperfections per 50 sq. in. equals total number of imperfections divided by 13

Experience in the U. S. I. Laboratories has shown that the number of imperfections per 50 sq. in. of 1½-mil first quality film as determined by this method should not exceed 5.

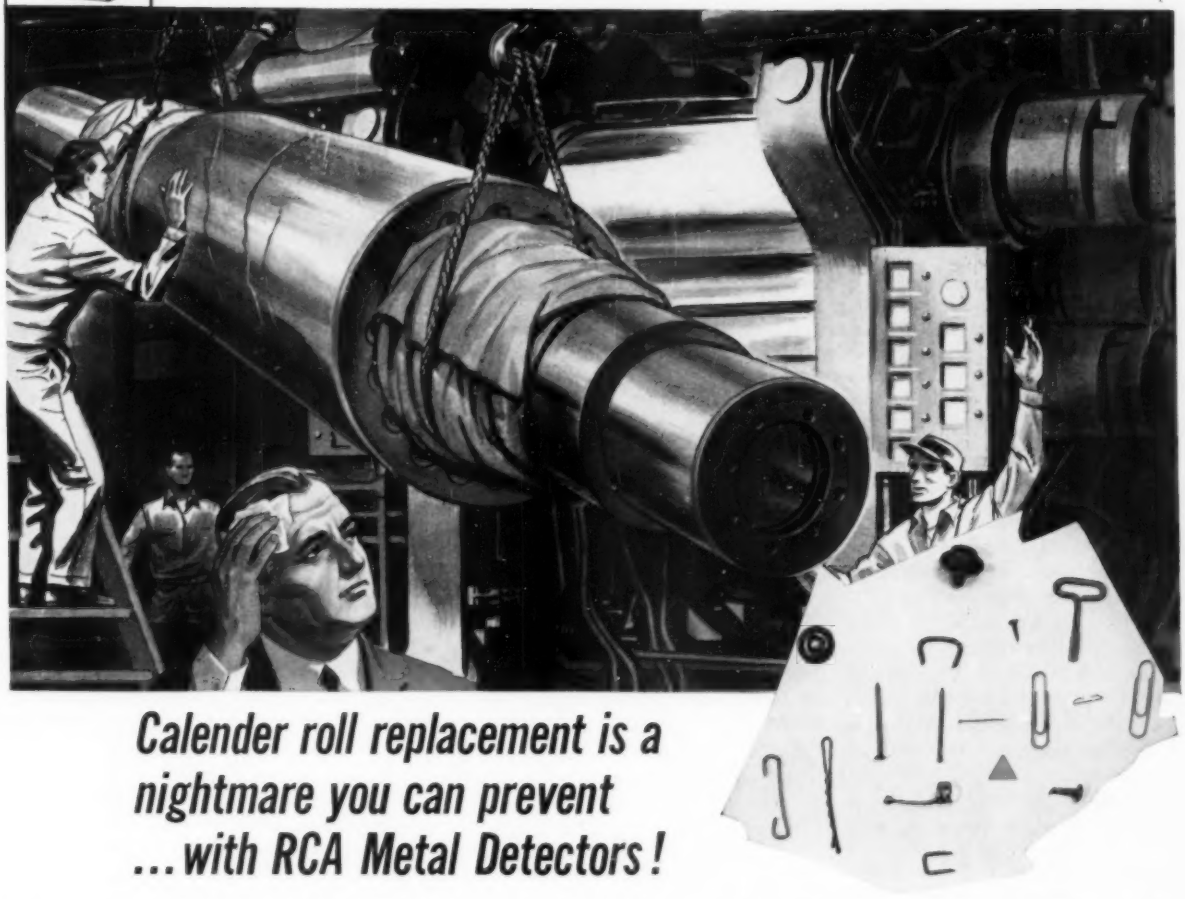
It is obvious that this easily made, low-cost quality control tool will be found helpful in molding shops and film plants to maintain high standards of production.—**End**

FIG. 5: Technician examines polyethylene film in polarized-light tester. Areas of stress, pinholes, and fisheyes are quickly identified.



...GATEWAY TO SAFETY FROM TRAMP METAL

ANOTHER WAY RCA SERVES INDUSTRY THROUGH ELECTRONICS



Calender roll replacement is a nightmare you can prevent ...with RCA Metal Detectors!

If the above picture was only a "bad dream," it wouldn't be worth discussing. Unfortunately, tramp metal damage to calenders DOES cause shutdowns in plastics plants. When this is the case, the loss of production is staggering, not to mention the cost of replacing or regrinding damaged roll! A well-known processor says, "Over the years RCA Metal Detectors have saved us tens of thousands of dollars in detecting foreign matter in our raw products which could damage our calenders. We feel the Detectors are cheap at any price."

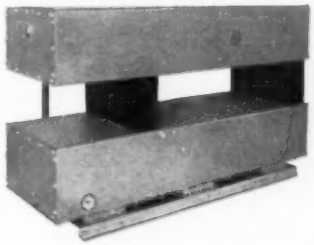
Used on strip material traveling at speeds from 15 to 1000 ft. per min., with full inspection sensitivity, the Detector can be arranged to sound an alarm, and/or stop the traveling material. In plant after plant, the RCA Electronic Metal Detector has paid for itself many times over through increased life of costly machinery, decreased downtime, and savings in product. It can be put to work quickly in *your* plant.

Find out today how the RCA Metal Detector can save you money. Write for latest literature, RCA, Dept. D-75, Building 15-1, Camden, N.J.

Tmk(s) ®

RADIO CORPORATION of AMERICA

CAMDEN, N.J.



RCA ELECTRONIC METAL DETECTOR

How to measure and control static charges on plastic webs

By T. F. McLaughlin Jr.*

Most plastic materials readily acquire electrostatic charges when subjected to friction. These charges can be especially troublesome when they occur on thin plastic films and laminates where they may cause serious problems in the handling of such webs in automatic equipment.

Various commercial devices are designed to reduce and control static charges. To apply these devices to best advantage and to gage their effectiveness, reliable electrostatic measuring instruments are needed.

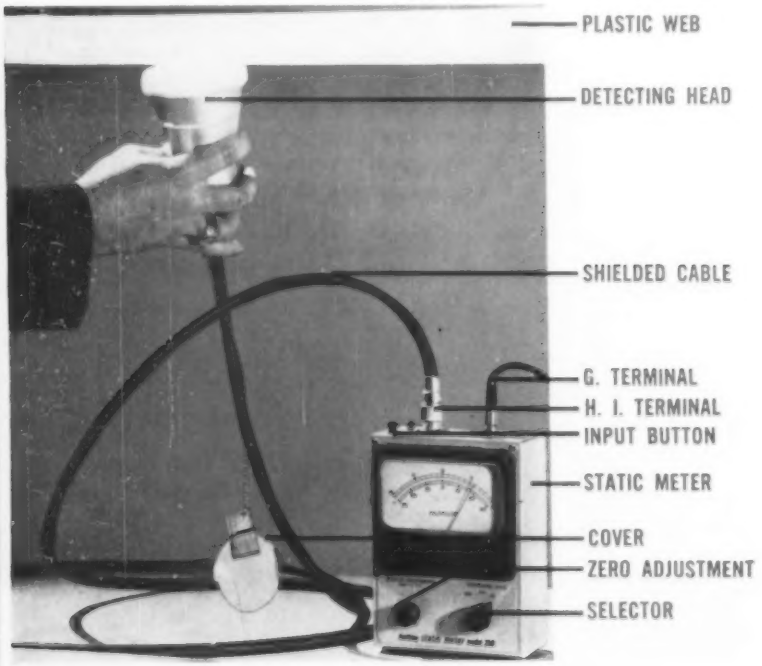
Until recently, electrostatic measuring devices specifically suited to the needs of the plastic film and laminating industry were not available. In order to fulfill this need, a novel static detecting head has been designed and tested. This head may be attached to a direct reading static meter through a flexible cable. The entire device is now commercially available.[1]

The atoms constituting matter contain equal numbers of electrons and protons. When this balance between electrons and protons is upset, the body has either an excess or deficiency of electrons and is said to be charged. Friction is one of the commonest means of upsetting this balance in a neutral body. In the case of plastic webs being handled on machinery, the alternating contacts and separations of the web with itself, with other materials, or with machine parts is sufficient to induce a charged state. Because of the high resistivity of most polymers, the electrostatic charges accumulate. They do not readily ground or dissipate into the surrounding air. Polyethylene, because of its low electrical conductivity, easily acquires charges of great intensity.

The composition and dielectric properties of the bodies contacting the film or laminate web may influence the polarity of the electrostatic charge and to some degree its magnitude. In the case of contact with a metal roller, the plastic web will acquire a negative charge. Where the plastic web contacts a non-metal such as a rubber roller, the magnitude and polarity of the charges it acquires will depend upon the relative conductivities of the two materials. The less conductive will be able to take electrons from the more conductive. This explains why polyethylene, with its extremely low electrical conductivity, is one material which will usually acquire a negative charge.

Temperature and humidity are environmental factors affecting the electrostatic charges on plastic webs. As temperature increases, the conductivity of both the plastic web and the surrounding air increases; therefore, the acquired charges will ground or dissipate more readily. Likewise, high humidity increases the conductivity of the air and, in addition, the surface of the web. In this manner, moisture facilitates the removal of electrostatic charges via conductivity to the atmosphere or by conductivity along the surface of the web.

FIG. 1: Over-all view of electrostatic measuring system.



The measuring system

We have developed a static measuring system which comprises two elements:

1. A static detecting head with a low-noise connecting cable.
2. A specially calibrated battery-operated electrometer.

The electrostatic measuring system, Fig. 1, left, detects static charges by the principle of electrostatic induction. When the detecting head (a neutral body) is brought near a charged plastic

*Sales Service Laboratory, Polychemicals Department, E. I. du Pont de Nemours & Co., Inc.

[1]Made by Keithley Instruments, Inc., 12415 Euclid Avenue, Cleveland 6, Ohio

web, a potential or voltage is induced on a sensitive electrode (the target) located within the detecting head. This sensitive electrode is connected to the electrometer and the induced charge changes the current flowing in the circuit of the instrument. This current change is measured by an indicating meter in the circuit. The electrometer circuit also permits the meter to distinguish the polarity of the charge.

The static detecting head (Fig. 2, right) has three major component parts: the target, the shield, and the cover. The target is connected to the high impedance (HI) terminal of the electrometer and is placed within, and insulated from, the conical metal shield. The purpose of this shield is to confine the response of the target to the charges being studied and to define the capacitance between the target and the plastic web. The shield is fitted with a metal slide cover which fits parallel to the surface of the target. This slide cover protects the target from the influences of electrostatic fields while the electrometer is being zeroed. To expose the target to the charges being studied, the slide is pulled out.

The conical shield on the detecting head has a depth of 2 in. and an included angle of 30°. A protective, insulating guard is fitted about its edge and a switch is provided for grounding the high impedance input terminal while the system is zeroed and calibrated (Figs. 2 and 3).

The meter is a battery-operated vacuum tube voltmeter with high voltage sensitivity and a wide operating range. A shielded cable permits the use of the small detecting head for measurements in locations where it would otherwise be too awkward to use the electrometer with a detecting head attached directly to it.

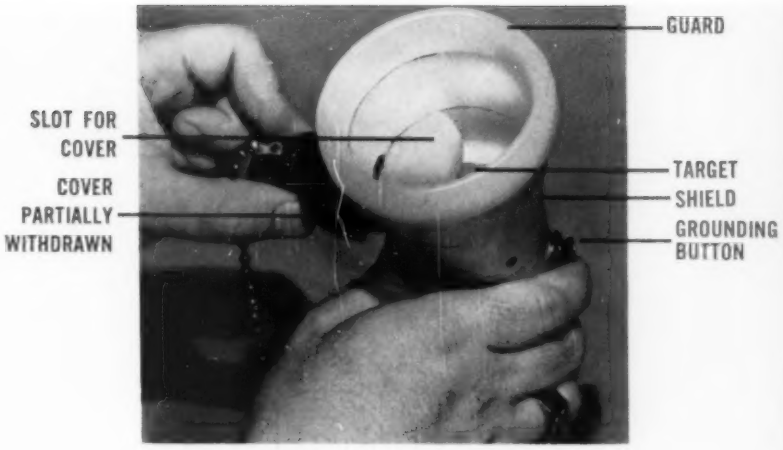


FIG. 2: Close-up of detecting head.

Operating the static meter

After the equipment has been zeroed, the detecting head is placed with its rim guard ⅜ in. from the charged plastic web and perpendicular to it. This distance is critical because it defines the projected area on the plastic web that the target disk can "see" from within its conical shield. The detecting head should also be kept away from the edges of moving or stationary webs during measurements because erroneous readings can result, due to the distorted electrostatic fields which are present at such edges.

The slide cover is then removed from the detecting head, exposing the target to the projected area on the charged web as defined by the taper of the conical shield and its distance from the web. A voltage E_2 is now induced on the target by the voltage, E_1, of the charged web, and noted on the panel meter. The meter is calibrated to read the potential on the charged film or laminate directly. This calibration, defined by both the geometry of the detecting head and the circuitry, and its placement may be periodically checked by placing a metal plate in the position to be later occupied by the charged surface.

For maximum accuracy, the panel meter reading should be near the ends of the meter scale. The sensitivity of the instrument is determined or adjusted by the meter range. 10-0-10 kv. is the more sensitive range, and 30-0-30 kv. is the less sensitive range. The lowest practical sensitivity available is 100-0-100 kv., which can be obtained with the 10-0-10 setting, but with the rim of the detecting head positioned 6 in. from the web being studied rather than ⅜ in. as mentioned before.

Practical applications

The static meter can be used to determine the distribution of charge on continuous plastic webs moving through processing equipment as well as on individual structures, such as plastic bags being handled in converting or filling machinery.

For the complete analysis of static charges on moving webs, the detecting head should be mounted to permit measurements across the width as well as along the length of the web while maintaining the proper distance from its surface. In this manner, a complete "contour map" of static charges over the moving web can be established.

Since distortions in the electrostatic field occur at the edges of the web as well as at contact points with the rollers and other machine parts, reliable readings cannot be taken at the edges or less than 6 in. from contact points.

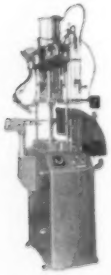
In the cases of large individual structures, the distribution of charges over the surface should be determined.

Correlating charge intensity (in volts) with familiar web handling problems, the following relationships have been found: dirt and dust pick-up begins at charge intensities of about 3 kv.; at 4 kv. an explosion hazard exists in flammable atmospheres; between 4 and 5 kv. handling problems begin with thin stationary films and laminates. When charge intensities of 6 to 7 kv. are present on the film, difficulties may be experienced in packaging machines. Finally, problems in controlling and regulating the film travel in film handling machinery become serious at charge intensities in the 12- to 13-kv. range. Using the meter while having any of the above **(To page 124)**

Mr. R. W. Van Riper, Jr., Vice President of T. F. Butterfield, Inc., makes a quality control check on the output of one of the 6 Stokes Model 741's installed in their Naugatuck, Connecticut plant. Truly automatic operation by these presses has substantially benefited this custom molding operation.

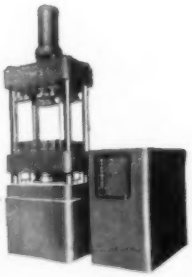
OTHER STOKES PRESSES FOR THERMOSET MOLDING

The Stokes Model 800 automatic . . . 15 and 25 ton models. Has all the advanced features of the larger Model 741's.



The Stokes Model 725 automatic . . . 25-ton capacity. A simple low cost machine for varying production runs.

The Stokes Model 726 semi-automatic compression molding press. 50, 100, 200 and 300 ton models.



The Stokes Model 727 semi-automatic transfer molding press. 50, 100, 200 and 300 ton models.

Some of the many small electric switch parts being made on Stokes Model 741 presses at T. F. Butterfield, Inc.

"Production rate doubled—product improved" —when Butterfield installed Stokes presses

T. F. Butterfield, Inc., Naugatuck, Connecticut, is a custom molder—operates over 60 molding presses. The six most recently acquired compression molding machines are Stokes Model 741's, which were chosen by Mr. Butterfield and an evaluation committee after careful comparison of several types.

These Stokes presses are used for molding plastic parts, such as switch and electrical device parts, of phenolic, urea, and melamine. One man easily monitors the six presses, resulting in a substantial savings in man-hours. Other benefits attributed to the Stokes presses include "improved product quality —greater product uniformity—increased production —fewer rejects".

According to Mr. R. W. Van Riper, Jr., Vice President of the company, these presses are producing at rates up to 1440 pieces per hour—double the previous production. Designed for continuous operation, these presses require very little standard maintenance. The ease of set-up and mold change-over cuts down-time to a minimum.

For your own molding operations, it will pay you to check the advanced features of the Stokes 741's that bring you fully automatic compression molding in its most fool-proof, most productive form. Twenty-five years of leadership in automatic molding is built into these presses:

Positive ejection, top and bottom . . . parts are mechanically combed off ejector pins on both top and bottom ejection.

Parts can't fall back into molds . . . feed and comb form a box closed front and back. Scrape-off discharges parts independent of gravity.

Simplified set-up . . . feed changeovers made in five minutes from pre-set loading boards . . . no cups to shift or adjust each time.

Faster cycles, higher output . . . dry cycle time is only 8 seconds. Fast closing and pressing speeds let you take full advantage of fast curing compounds.

Tops in versatility . . . Hydraulic top and bottom ejectors and fully adjustable breath controls are standard. Side draw . . . integral powder pre-heat . . . automatic rope pre-mix feed . . . fully automatic transfer are available to suit the job.

Press capacities of 50, 75, 125 and 200 tons are available. Write today for a copy of our new bulletin on the Model 741—for a consultation on your own requirements—or for a cost study on your own specific applications.

Plastics Equipment Division
F. J. STOKES CORPORATION
5500 Tabor Rd., Philadelphia 20, Pa.

STOKES

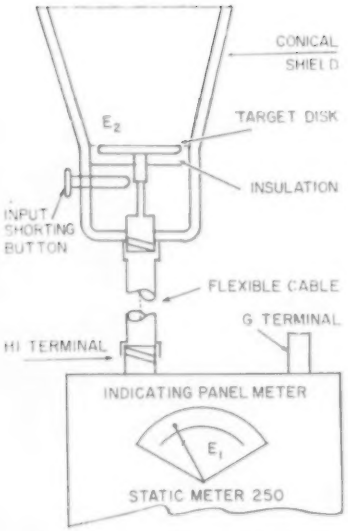


FIG. 3: Schematic of detecting head.

difficulties can help isolate the major causes of the difficulties and facilitate corrective measures.

To evaluate the effectiveness of anti-static devices, agents or compounds with moving plastic webs, the detecting head may be mounted at a point on the equipment handling the web. The anti-static devices or agents may then be applied to the web before it passes the detecting head.

Static eliminator devices

Static charges on plastic webs may be reduced or entirely eliminated through either conduction or neutralization.

The most common method of static elimination through conduction employs tinsel or metal brushes which contact the plastic web and conduct the charges to ground. Conductive discharge has limited effectiveness because it removes only the surface charges that are picked up by the metal at the contact points.

Conduction to the atmosphere by increasing the conductivity of the air is another means of static elimination. An increase in the moisture content of the air may permit charges on the web surface to drain away rapidly. This same moisture increase may also cause a thin layer of moisture to deposit on the web surface, making it more conductive.

Static neutralizers do not make physical contact but rather supply ionized air between their grounded structure and the charged web. They are commonly mounted from ¼ to ½ in. from the surface of the plastic web. Ionized particles are then drawn out of this air to neutralize all or part of the opposite charges residing on the film. There are three principal types of static neutralizers in use: high voltage, induction, and radioactive.

The high voltage neutralizer has numerous needle points along a metal bar. These needles do not contact the web and are charged to a potential of 5000 to 15,000 v. a.c. The electrostatic field surrounding the needle points is the force which ionizes the surrounding air.

The effectiveness of high voltage neutralizers depends upon the amount of ionized air supplied per square foot of plastic web. This amount in turn depends on the potential on the needle points. The potential of the needle points is limited to approximately 15,000 v. because arcing may occur above this. On webs moving at 50 ft./min. or more, the effectiveness of high voltage neutralizers is seriously impaired because of their ionizing limit. Several may have to be employed to be effective.

Induction neutralizers consist of grounded wire bristles or tinsel which do not touch the surface of the web. The electrostatic field between these grounded points and the charged web ionizes the air surrounding these points.

The induction neutralizer depends upon the static charge on the plastic web for ionizing the air about the metal points, therefore this neutralizer does not become fully effective until there is a certain minimum charge on the web. This minimum charge depends on the design of the neutralizer and may range from 300 to 2000 volts. The higher the static charge on the web, the greater will be the ionization of the air and the better the operation of these neutralizers. They are most effective at static charge potentials above 5000 v. and appear to have no upper limit of effectiveness. Induction neutralizers are simpler and less expensive than other types.

Radioactive neutralizers employ radium or polonium sandwiched between gold foil to block out beta and gamma radiation. This sandwich is mounted along a grounded metallic bar. The alpha particles emitted from the disintegrating nuclei of the radium or polonium ionize the air. The foil is mounted in a suitable protective housing to guard against stray radiation.

These neutralizers are used primarily where the possible spark discharge of other neutralizers might cause an explosion hazard. The ionizing capacity of these neutralizers is somewhat lower than that of high voltage or induction types and is usually limited to an upper potential of 5000 v. of static charge.

The effectiveness of static neutralizers on webs moving at high speeds may be reduced by the thin layer of non-ionized air that is dragged along by the web and that forms a baffle that may prevent the ionized particles from reaching the surface of the web. A simple method of reducing this air baffle is to install a "knife" across the width of the web in order to act as a barrier to block this layer of air.

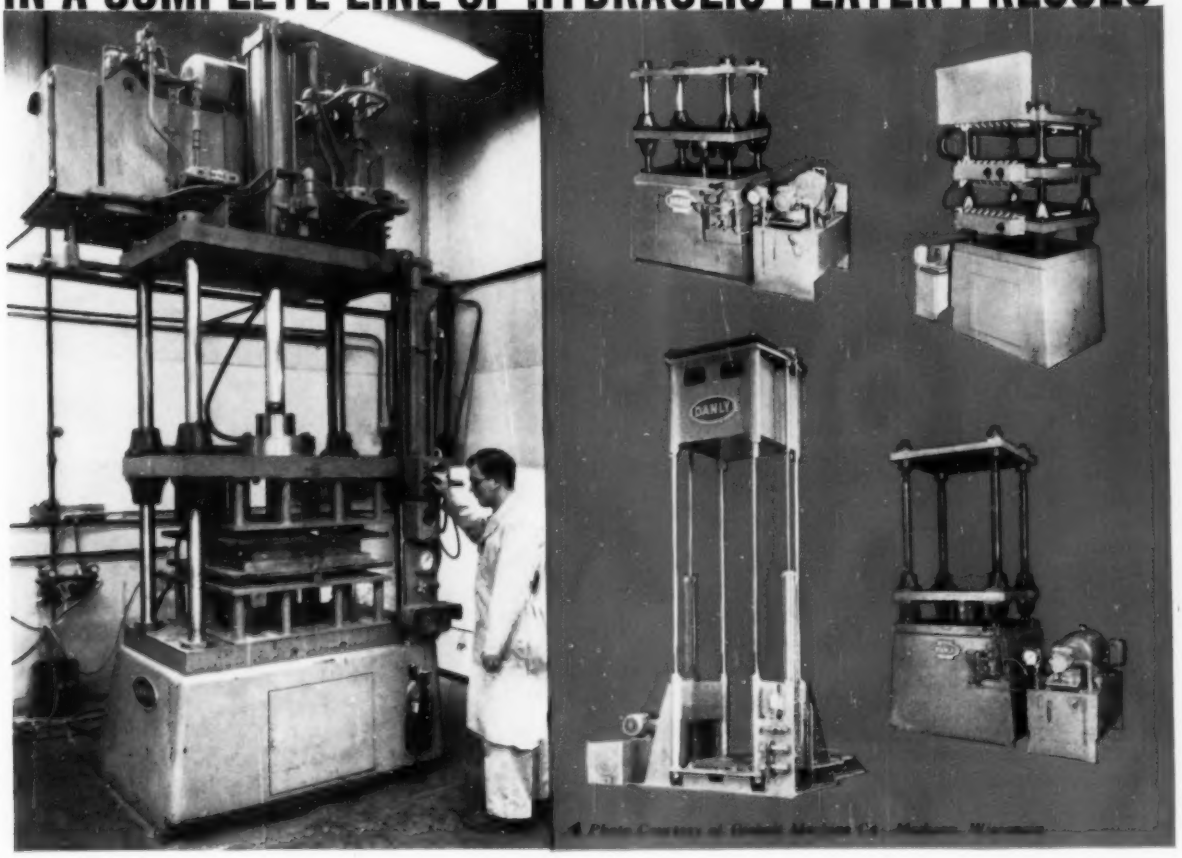
Chemical anti-static agents

The basic requirement for an anti-static agent is that it prevents the accumulation of static charges and/or leaks them away rapidly. An anti-static agent should increase the surface conductivity of the plastic article so that accumulated charges will leak rapidly into the surrounding atmosphere or machine parts. This increase in surface conductivity can be accomplished by either raising the concentration of moisture through hygroscopic addition on the surface of the plastic article or by forming an organic electrolytic layer.

One obvious way to reduce static accumulation is to reduce the coefficient of sliding friction between the plastic article and the material contacting it. To accomplish this, it is necessary that an anti-static agent form a lubricating film on the plastic.

Numerous chemicals have been proposed as anti-static agents for plastics. Most belong to one or the other of five classes: **(To page 192)**

GET DEPENDABLE DANLY PERFORMANCE IN A COMPLETE LINE OF HYDRAULIC PLATEN PRESSES



Danly Hydraulic Platen Presses offer you the extra precision and brawn for which Danly equipment is known throughout industry. Danly presses are engineered to the highest machine-tool standards with design innovations which add the extra measure of performance you want.

You'll find top precision in the long-wearing alloy steel columns, accurately-machined platen faces, and demountable bushings on Danly Platen Presses. Parallelism is held to tolerances equivalent to the finest Danly Precision Die Sets.

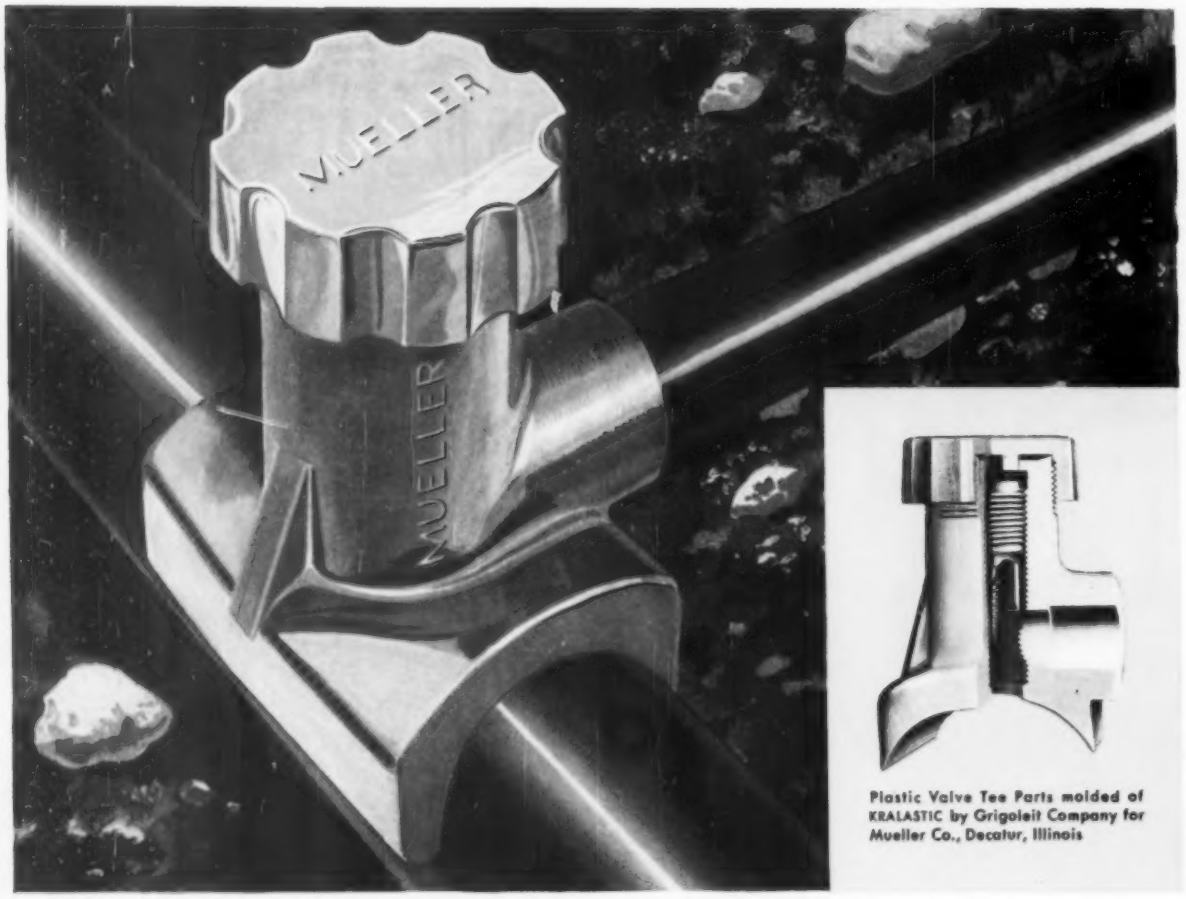
Danly Platen Presses are available with one or more moving platens, up-acting or down-acting. Capacities range from 5 to 500 tons. Variations in stroke, speed and pressures are offered as required. Heating elements and other accessories are also available. Your choice of electrical control or lever operation. Whatever you need in a hydraulic platen press you can obtain from Danly. For more complete details and specifications, write for your copy of the new catalog, "Danly Hydraulic Platen Presses."

DANLY

DANLY®

DANLY MACHINE SPECIALTIES, INC., 2100 S. LARAMIE AVE., CHICAGO 50, ILLINOIS

Naugatuck KRALASTIC®



Plastic Valve Tee Parts molded of KRALASTIC by Grigoleit Company for Mueller Co., Decatur, Illinois

KRALASTIC valve tee now makes safe connections under pressure!

This new Mueller valve tee reflects a careful and intelligent application of material and design...not the least sign of which is the use of KRALASTIC for the tee body, cap and plug. (Pilot screw and cutter are of stainless steel.)

KRALASTIC is the unique rubber-resin blend that has proved so outstandingly successful in oil, gas, water, and chemical pipe and fittings that more than 9,000 miles of KRALASTIC systems are already in use. And here in this valve tee KRALASTIC has particular advantages, beyond the fact that it forms a perfect mate to the many miles of KRALASTIC in gas mains.

Because the unit contains a built-in cutter to permit tapping a plastic main under pressure, strength and dimensional stability are of unusual importance. And the use of clamps and drilling tools for installation adds further to the need for toughness, a feature in which KRALASTIC is exceptional.

Look for KRALASTIC not only in pipe and fittings, but in tool handles, machine housings...any place where toughness, strength, light weight, dimensional stability and freedom from corrosion are an asset. For more information on KRALASTIC pipe and fittings, or on KRALASTIC for other applications, write us today.

United States Rubber
Naugatuck Chemical Division
215 K ELM STREET
NAUGATUCK, CONNECTICUT

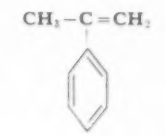
KRALASTIC RUBBER-RESINS • **MARVINOL** VINYLS • **VIBRIN** POLYESTERS

Akron · Boston · Chicago · Gastonia · Los Angeles · Memphis · New York · Phila. · CANADA: Naugatuck Chemicals · Elmira, Ont. · Cable: Rubexport, N.Y.

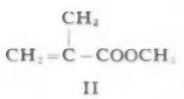
A new acrylic thermoplastic

By Charles H. Schramm† and Joseph Briskin†

A new acrylic-type plastic, Baker PL-11, is a copolymer of alpha-methylstyrene (I) and methyl methacrylate (II).



I



II

It is made by polymerizing a 1:3 mixture (by weight) of these two monomers in the presence of a peroxide catalyst. Material produced in this manner possesses an intrinsic viscosity in dioxane of 0.4 at 77° F.

The combination of methyl methacrylate and alpha-methylstyrene in the specified ratio gives a polymer possessing properties considerably superior to those of the common transparent plastics. This is particularly evident when the heat distortion temperatures of the polymers are compared. These temperatures are 203° and 190° F. for methyl methacrylate and styrene polymers, respectively, whereas that for PL-11 is 248° F.

Properties

PL-11 is a clear transparent thermoplastic material possessing excellent outdoor weatherability. It can be injection and compression molded and extruded. In addition, this resin retains its optical properties even under prolonged exposure to boiling water; samples boiled in water for 6 mo. were unchanged. The physical and electrical properties of PL-11 are summarized in Table I, p. 128.

As far as chemical stability is concerned, PL-11 resists attack by most acids and alkalies. It is unaffected by petroleum oils, silicones, aliphatic hydrocarbons, and alcohols. PL-11 is not resistant to oxidizing acids. It possesses excellent craze resistance when subjected to contact with organic solvents and essential oils. Injection molded samples of the polymer have been subjected to repeated steam sterilization at 5 p.s.i. pressure without loss of either their transparency or their shape characteristics.

The superior heat resistance of this plastic was demonstrated by subjecting a series of extruded rods of PL-11, commercial polymethyl methacrylate (MMA), methylstyrene-acrylonitrile resin (MSAN), and styrene-acrylonitrile resin (SAN) to temperatures ranging from 212° to 290° F. Eight-inch annealed rods ⅛ in. in diameter were supported at one end and allowed to sag under their own weight. The results are summarized in Table II, p. 130. Effects on specimens of four different materials that were heated at 250° F. for 2½ hr. are shown in

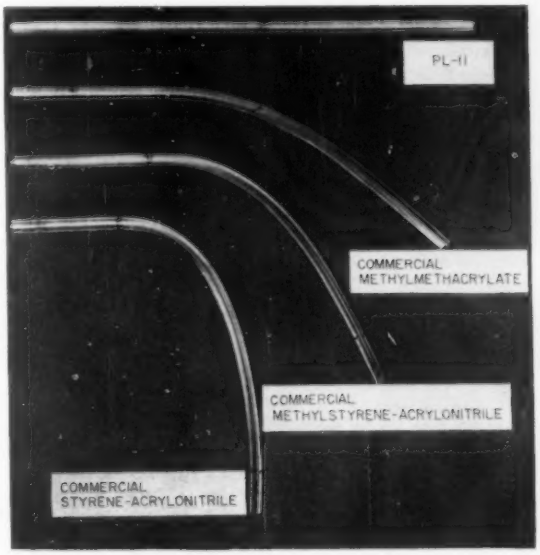


FIG. 1: Effect of temperature on straight extruded rods at 250° F. for 2½ hr.; all rods clamped horizontally at one end.

*Reg. U.S. Pat. Off.
†J. T. Baker Chemical Co., Phillipsburg, N. J.

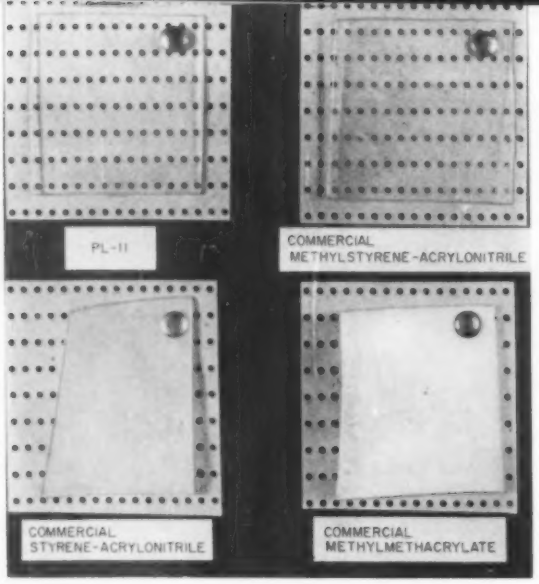


FIG. 2: Effect of boiling water on clarity after a period of 64 hr. continuous immersion.

Table I: Properties of Baker PL-11

Property	*ASTM method*	*Values*[a]
Heat distortion temperature[b]		
264 p.s.i., °F.	D648	244–252
66 p.s.i., °F.	D648	261–267
Transparency	—	Excellent
Color	—	Water white
Color after 30 days immersion in boiling water	—	Water white
Tensile strength, p.s.i.	D638	9000
Elongation, %	D638	2
Flexural strength[c]		
At 77°F., p.s.i.	D790	15,000
At 160°F., p.s.i.	D790	9,500
At 220°F., p.s.i.	D790	7,000
At 200°F., p.s.i.	D790	5,000
Flexural modulus of elasticity[c]		
At 77°F., p.s.i.	D790	480,000
At 160°F., p.s.i.	D790	335,000
At 200°F., p.s.i.	D790	275,000
At 220°F., p.s.i.	D790	215,000
Izod impact strength, milled notch, at 77°F., ft.-lb./in. of notch	D256	0.2–0.3
Specific gravity	D792	1.17
Rockwell hardness	D785	M102–M105
Dielectric constant		
10^5 cy./sec.	D150	3.00
10^6 cy./sec.	D150	3.03
Dissipation factor		
10^5 cy./sec.	D150	0.028
10^6 cy./sec.	D150	0.011
Dielectric strength, short time, ⅛ in. thickness, v./mil	D149	475
Water absorption, 24 hr.		
Immersion at 77°F., %	D570	0.2
Immersion in boiling water, %	—	1.5
Odor	—	None
Taste	—	None
Light stability	—	Very good
Machining qualities	—	Good
Flammability, ½ by ½ by 5 in. specimen, in./min.	D635	1.7

[a] Values are typical and subject to variations caused by molding conditions and other factors.
[b] See Fig. 4, p. 130.
[c] See Fig. 5, p. 130.

Fig. 1, p. 127. Identical specimens of these polymers were immersed in boiling water for 3 days. Only the PL-11 remained clear and colorless. The polymethyl methacrylate had become opaque and both the methylstyrene and the styrene-acrylonitrile polymers were hazy. With the exception of PL-11, all of the samples were distorted and this was most pronounced in the styrene-acrylonitrile and methyl methacrylate materials. Sheets of these same polymers which had been exposed to boiling water for 64 hr. are shown in Fig. 2, left.

Sheets of PL-11, commercial polymethyl methacrylate, and polystyrene were exposed to the atmosphere and sunlight for 12 mo. in western New Jersey. There was no appreciable color development in the first two samples. A graph of these results is shown in Fig. 3, p. 130.

Weathering tests made in southern Florida yielded similar results which again showed PL-11 to be equivalent to polymethyl methacrylate in color stability. No significant change was evident in these two materials after 12 mo. exposure. The excellent color stability of the new polymer at elevated temperatures was demonstrated in tests conducted at 239° F. for 7 days.

Processing Baker PL-11

PL-11 has been processed by almost every technique used on thermoplastic polymers. In general, the technology involved with PL-11 closely approximates that encountered with the methyl methacrylate resins currently commercially available.

The additional heat resistance of PL-11 seems to be due to increased interaction between the molecular chains, with a resultant increase in melt viscosity over methyl methacrylate polymers. Flow rate data (Fig. 6, p. 130) indicate that the viscosity of PL-11 is about 1.5 times that of methacrylate polymer over a shear rate range of 10 to 100 sec.$^{-1}$. However, the viscosity is strongly dependent on temperature, and viscosity-temperature data indicate that raising the temperature about 15° F. will bring the viscosity down to the same level as

Get on the Bandwagon with . . .

EpoxyGen*

2 remarkably high quality grades of EPOXIDIZED SOYBEAN OIL from General Mills

Developed by the people who first discovered and patented the use of epoxidized fatty esters as plasticizing stabilizers for vinyl resins. *EpoxyGen* is made from pure soybean oil specially produced at General Mills' soybean processing plants. *EpoxyGen* sets a new high standard of quality at no extra cost.

- UP TO 10% HIGHER EPOXY CONTENT
- UP TO 50% LESS IMPURITIES
- UP TO 50% LOWER VISCOSITY

Choose either **EpoxyGen** 80 (Regular Grade) or **EpoxyGen** 90 (Premium Grade), and prove to yourself that **EpoxyGen:**

- PROVIDES GREATER STABILIZATION
- IS MORE COMPATIBLE
- HAS LESS TENDENCY TO SPEW
- IS MORE UNIFORM

For complete technical information, write to:

EpoxyGen
Department 33-140 MP-3
GENERAL MILLS, INC.
2010 East Hennepin Avenue
Minneapolis 13, Minnesota

General Mills

* EpoxyGen *is a trademark of General Mills.*

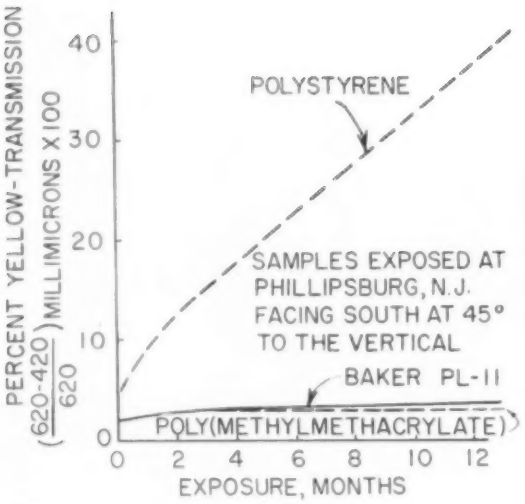


FIG. 3: Weathering stability of Baker PL-11

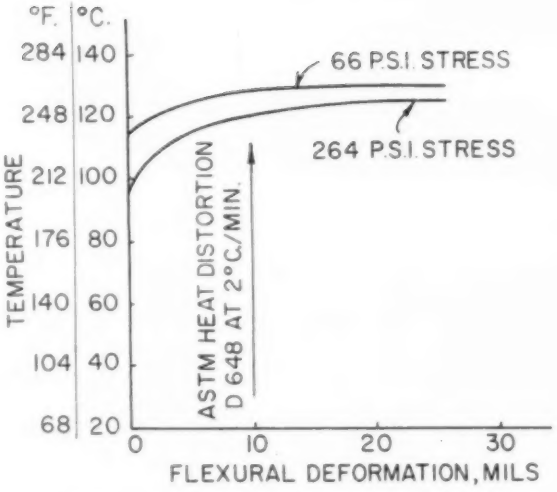


FIG. 4: Flexural deformation vs. temperature for PL-11

methyl methacrylate polymer. The optimum conditions for processing are generally similar to those found in processing of heat-resistant acrylics.

When injection molding PL-11, a pre-drying period of 2 to 3 hr. at 200° F. is recommended to remove moisture. However, in some cases, excellent moldings have been produced without any pre-drying whatsoever.

Since the material can be considered to be of the "hard flow" variety, care must be taken to eliminate those factors that lead to early freeze-off at the gate with resultant short shots. The use of pin-point or restricted gating is not recommended. Runners and sprues should be short and large in diameter (preferably full round). A generous radius, blending the gate to the cavity wall, is also desirable.

The correct cylinder temperature setting will vary with injection molding machines, cycles, die designs, etc. Lower temperatures will be required for large cross-sections involving long cycles, while for molding pieces of thin cross-section, higher temperatures are necessary. Cylinder temperatures of 420 to 520° F. appear to be adequate for most molding jobs. The mold temperature should be controllable and maintained as high as practical for each molding. A mold temperature of 160 to 220° F. is recommended. The rate of injection should be fast enough to fill the mold before the gate freezes. However, excessive injection rates may lead to "jetting." Injection

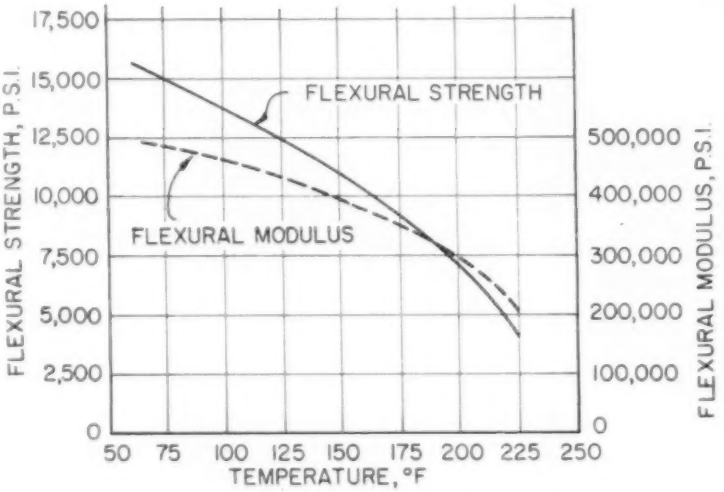


FIG. 5: Flexural properties versus temperature for Baker PL-11

Table II: Sag resistance of various polymers

Exposure					
Time	*Temp.*	*PL-11*	*MMA*[a]	*MSAN*[b]	*SAN*[c]
72 hr.	212°F.	Excellent	Poor	Very poor	Very poor
72 hr.	240°F.	Excellent	Very poor	Very poor	Very poor
72 hr.	250°F.	Excellent	Very poor	Very poor	Poor
20 min.	270°F.	Excellent	Fair	Poor	Poor
5 min.	290°F.	Excellent	Fair	Poor	Poor

[a] Polymethyl methacrylate
[b] Methylstyrene-acrylonitrile resin
[c] Styrene-acrylonitrile resin

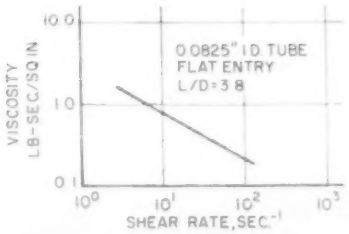
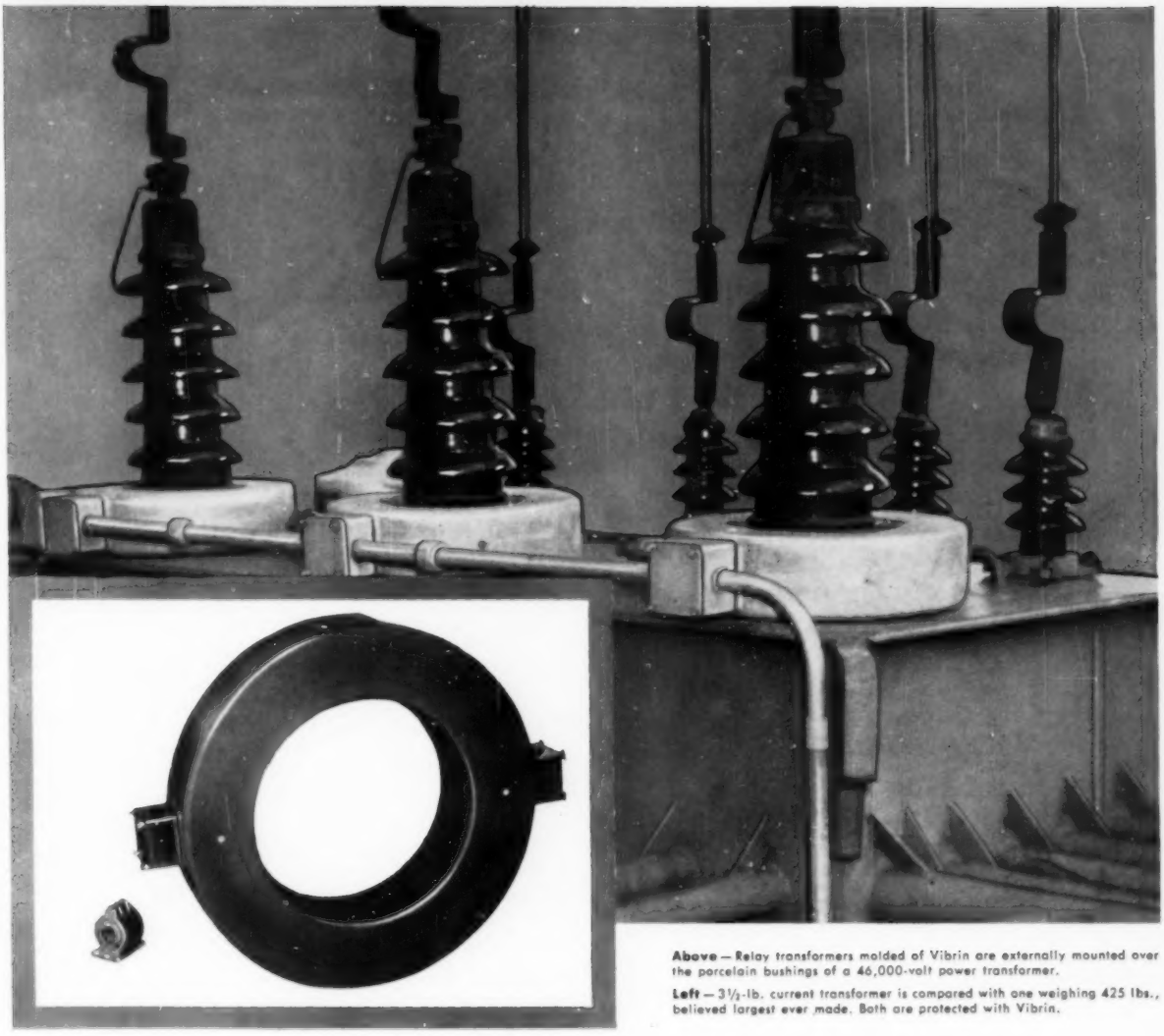


FIG. 6: Flow properties of Baker P-11 at 500° F.

tures described below gives the

Naugatuck VIBRIN



Above—Relay transformers molded of Vibrin are externally mounted over the porcelain bushings of a 46,000-volt power transformer.

Left—3½-lb. current transformer is compared with one weighing 425 lbs., believed largest ever made. Both are protected with Vibrin.

World's largest electrical molded transformer... potted and housed with **VIBRIN**

Associated Engineering Company—developer of the first electrical instrument transformers to take advantage of a polyester resin for both insulation and housing—has used Vibrin® from the start.

Chosen because of its high dielectric strength, proved resistance to weathering, and desirable casting properties, Vibrin effectively shields against salt water, acids, alkalies, sulphur and other corrosive chemicals. Poured into a mold around the core and coils, the Vibrin hardens to form a one-piece unit with even the attaching lugs molded in. Production time and costs of metal housings, porcelain bushings, and oil or asphaltic insulating compounds are eliminated.

Whatever your potting or encapsulating need, small or large, simple or involved, investigate the advantages a superior-quality Vibrin resin offers you. Write our nearest district office or address below for more information.

United States Rubber
Naugatuck Chemical Division
842V ELM STREET
NAUGATUCK, CONNECTICUT

KRALASTIC RUBBER-RESINS • **MARVINOL** VINYLS • **VIBRIN** POLYESTERS

Akron · Boston · Gastonia · Chicago · Los Angeles · Memphis · New York · Phila. · CANADA: Naugatuck Chemicals · Elmira, Ont. · Cable: Rubexport, N.Y.

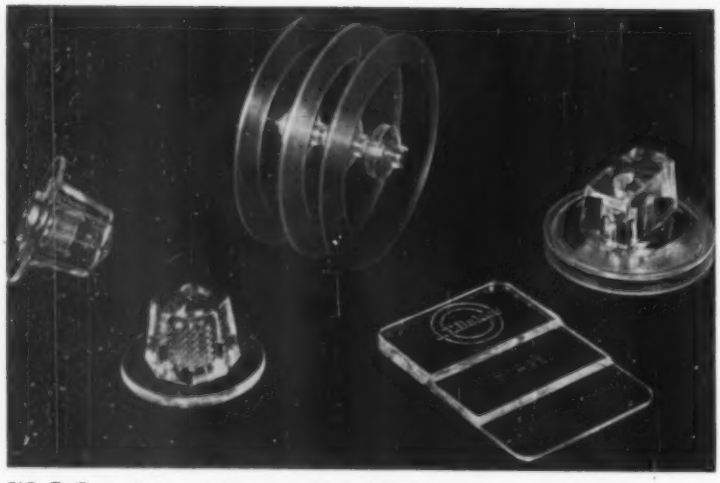


FIG. 7: Typical pieces injection molded of PL-11.

pressures of the order of 15,000 to 20,000 p.s.i. or even higher will ordinarily be required for proper molding operations.

Under correct conditions comparatively stress-free moldings of PL-11 can be obtained. Moldings that contain high stress concentrations will not give good service with respect to dimensional stability at elevated temperatures or resistance to chemical attack. If a stressed condition cannot be overcome by correct processing conditions, the use of annealing to lower and redistribute the stress is suggested. The highest temperature possible without distorting the part should be used. Temperatures as high as 230° F. have proven satisfactory, but a starting temperature of 200° F. is suggested. Annealing time will depend on the thickness of the part. Figures 7 and 8, above, are illustrative of the type of pieces that can be made successfully by injection molding.

Extrusion of PL-11 in various shapes has been accomplished satisfactorily. On single-stage machines the polymer must be dried thoroughly. Since the extrusion of PL-11 requires slightly higher temperatures than methyl methacrylate resins, the effect of trapped moisture in producing bubbles and surface imperfections is magnified. However, the extra heat resistance of PL-11 makes it possible to pre-dry the feed at temperatures that would cause other polymers to "cake." In general, 2 to 3 hr. at 250° F., or 8 to 10 hr. at 230° F. will be sufficient. Lower temperatures will require a longer drying period.

FIG. 8: Container injection molded of PL-11. Diameter is about 8 inches.

PL-11 can be used with most plastics extrusion machines. However, experience indicated that equipment with the design features described below gives the best results. These have been obtained with machines in which the screw was full flighted, with a compression ratio of about 2:1 obtained by decreasing the channel depth while retaining a constant pitch. A neutral screw proved to be most desirable. Torpedoes or shallow metering sections are not recommended since they tend to increase the stock temperatures. Breaker plates and screen packs should not be used, and to minimize back pressure, the die lands should be as short as possible.

The proper temperature for extrusion will depend on the extruder, screw, and die design. As a rule, PL-11 will require higher temperatures (about 20° F.) than the same equipment would need to run ASTM Grade 8 heat-resistant acrylic. A 2½ in. diameter extruded PL-11 rod of good quality was obtained at 430 to 440° F. barrel temperature and 440° F. die temperature. The screw speed should be kept on the slow side, i.e., 20 to 30 r.p.m. Samples of extruded tubing and rod are shown in Fig. 9, below.

The plastic can also be readily formed by compression molding. The usual procedure is to charge the mold with PL-11, heat until the mold reaches 320 to 350° F., apply pressures of 1000 to 2000 p.s.i. for about 5 min., and cool. The bar and sheet shown in Fig. 9 have been formed by this technique. In addition to the usual thermoplastic processing methods, PL-11 lends itself to most fabricating and decorating techniques. The material is easily cemented, and moldings can be machined, painted, and metallized.—**End**

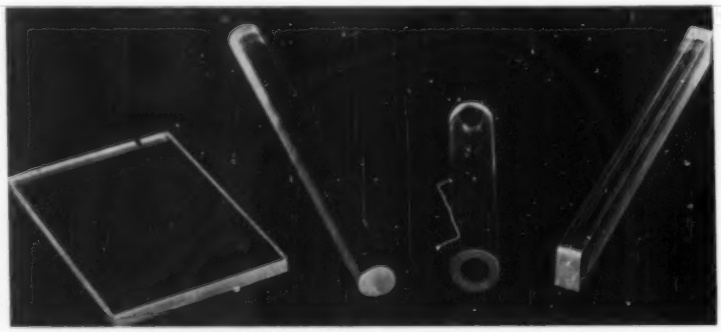
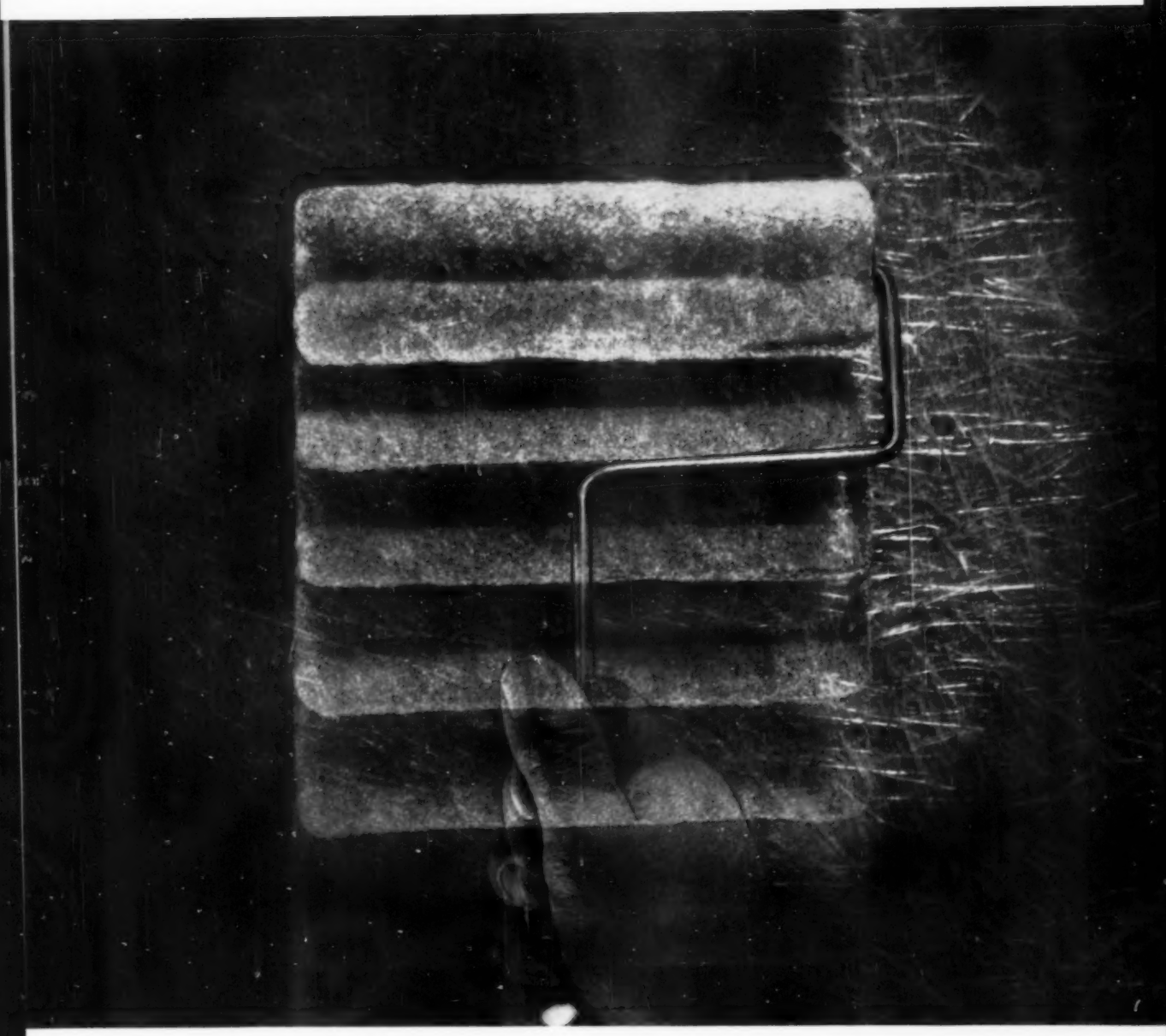


FIG. 9: Typical moldings and extrusions from PL-11.



Leading roll in resin performance

Layup time is reduced, wasteful flooding eliminated, production rates increased.

Faster wetting, rapid curing GLIDPOL layup resins make these dramatic savings possible wherever they are used in the reinforcement of plastic parts.

GLIDPOL layup resin systems are ideally suited to the manufacture of boats, bathtubs, sinks, swimming pools, truck bodies, panels, tanks and other products by the hand layup technique. Write for complete information on the resin system best designed to meet your particular requirements.

QUALITY Glidden PRODUCTS

RESINS FOR EVERY APPLICATION

The Glidden Company
INDUSTRIAL PAINT DIVISION
900 Union Commerce Building • Cleveland 14, Ohio
In Canada: The Glidden Company, Ltd., Toronto, Ontario

There's a GLIDPOL Polyester Resin system, plus Glidden Technical Service, to help you do it better, more economically, whatever your product, process or problem.

Microstructure of polymer coatings on magnet wire

By Gerald W. Recktenwald* and Daniel M. Trollinger*

The trend toward higher temperatures in motors has necessitated the development of new coatings for magnet wire insulation. New techniques must be developed to properly evaluate an enamel, to elucidate the properties observed, and to predict its behavior. The techniques described in this paper show the presence or absence of discrete enamel layers, their number and thickness, and the degree of symmetry of the enamel build. The types of coatings investigated include polyvinyl formal, polyester, and acrylonitrile-acrylate copolymer.

Enameled magnet wire used to generate a magnetic field in motors, relays, and transformers is available in nearly 300 different varieties. Differences in properties between several of the most important polymer coatings prompted examination of the enamels to determine if the physical makeup of the coating could account for the observed properties.

The insulating enamel is applied as a thin wet film of various resins suspended or dissolved in solvents. The film is then "flashed" or cured in an oven tower. The wire is ordinarily copper. The continuous process of film application and curing is repeated until the desired number of coatings have been made (usually 4 to 12). The result is a multi-coated wire with an extremely hard and tough, although flexible, coating.

In studies of magnet wire insulation, the usual method of measuring the total coating's thickness with a micrometer leaves much to be desired. Metallographic techniques were adopted and modified to determine the following: 1) the presence of enamel layers; 2) the number and thickness of each enamel layer; 3) the total thickness of the enamel coating; and 4) the uniformity in thickness of a given layer.

Three types of enameled wire were studied: Type A—thermal Class 150C, polyvinyl formal base; Type B—thermal Class 130C, polyester base; and Type C—thermal Class 130C, special, acrylonitrile-acrylate copolymer base. The thermal class for this study indicates the temperature in degrees Centigrade to which an enamel may be subjected for continuous operation.

*Appliance and Television Receiver Div., General Electric Co.

Specimen preparation

Samples were first cut into 6 or 8 specimens each ¼- to ½-in. in length and mounted in a thermosetting resin[1] as an ordinary metallographic mount. Better contrast was obtained by using different colored mounting resins. To facilitate holding the specimens perpendicular during the mounting process, it was necessary in this analysis to first place them in a ¼-in. outside diameter by ½-in. long soft copper tube.

The mounts were ground and polished by the following steps: 1) rough grind with #240 grit aluminum oxide abrasive cloth belt; and 2) fine grind successively with numbers 2, 1, 1/0, 2/0, and 3/0 grit emery polishing disks. Most of the samples investigated to date could be satisfactorily examined after this procedure. However, in some cases it was necessary to rough polish with #30 medium diamond polishing compound on canvas cloth.

Clean disks were necessary for each sample mount. It was necessary to repeat the fine grind with #3/0 disk several times in order to bring out the enamel layers distinctly. Further polishing or etching with ferric chloride plus hydrochloric acid solution, hydrogen peroxide **(To page 194)**

[1]Bakelite Mounting Powder #1380 AB, distributed by Buehler Ltd., Evanston, Ill.

Table I: Number and thickness of layers of enamel on copper wire

Coating number	Thickness of each enamel layer				
	Type A, 6 pass (Fig. 1)	*Type A, 8 pass (Fig. 2)*	*Type A, 12 pass (Fig. 3)*	*Type B, 6 pass (Fig. 4)*	*Type C, 4 pass (Fig. 5)*
	mils	*mils*	*mils*	*mils*	*mils*
1	0.12	0.32	0.14	1.30	0.25
2	0.20	0.24	0.18	—	0.47
3	0.39	0.32	0.14	—	0.63
4	0.31	0.32	0.06	—	0.55
5	0.28	0.24	0.20	—	—
6	0.24	0.24	0.14	—	—
7	—	0.39	0.12	—	—
8	—	0.16	0.08	—	—
9	—	—	0.20	—	—
10	—	—	0.06	—	—
11	—	—	0.12	—	—
12	—	—	0.12	—	—
Total build	1.54	2.23	1.56	1.30	1.89

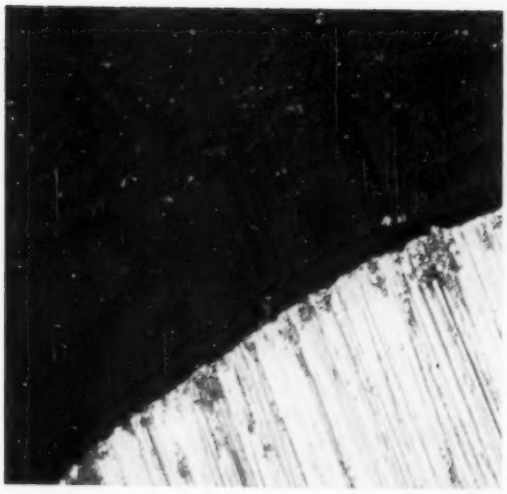


FIG. 1: 6 pass, Type A coated magnet wire, 500×, showing metal, enamel coatings, mounting resin.

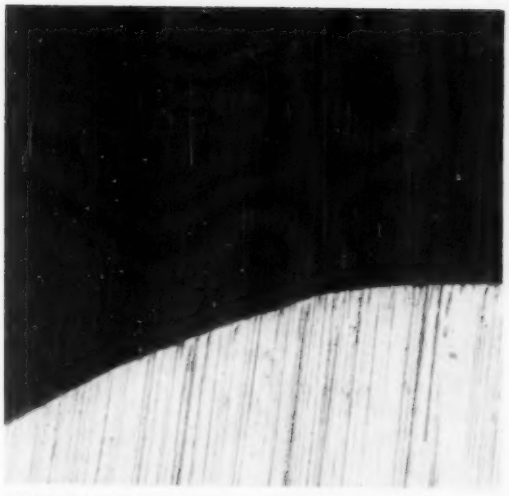


FIG. 2: 8 pass, Type A coated magnet wire, photographed to 500 power.

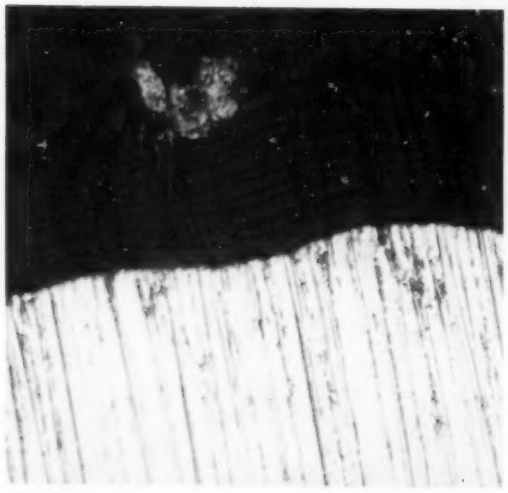


FIG. 3: 12 pass, Type A coated magnet wire, photographed to 500 power.

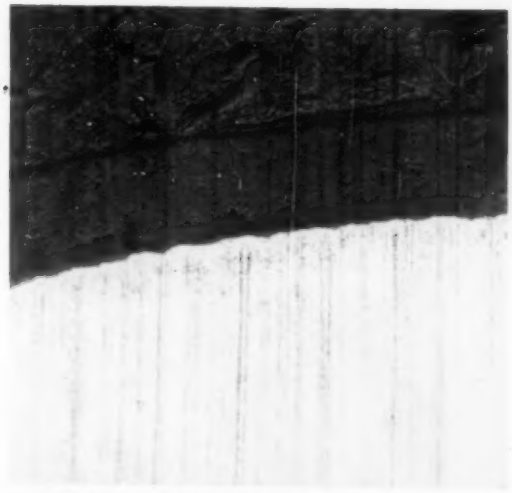


FIG. 4: 6 pass, Type B coated magnet wire, photographed to 500 power.

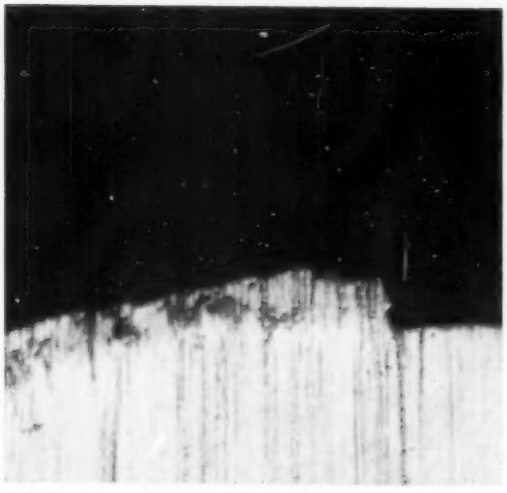


FIG. 5: 4 pass, Type C coated magnet wire, photographed to 500 power.

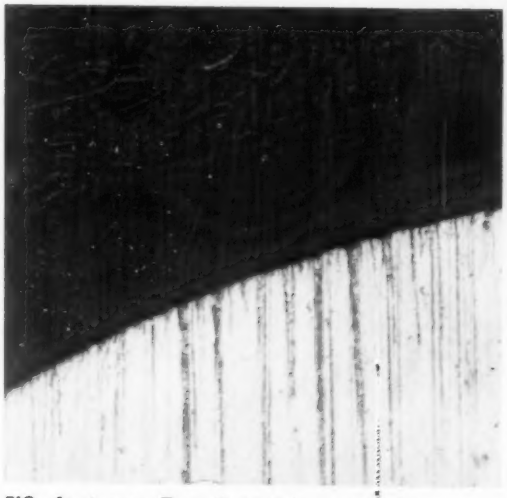


FIG. 6: 4 pass, Type C coated magnet wire after 6 hr. at 150° C., 500X.

Announcing

Escon

TRADEMARK

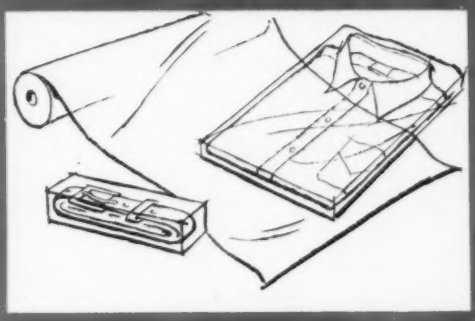
...THE NAME FOR

ENJAY

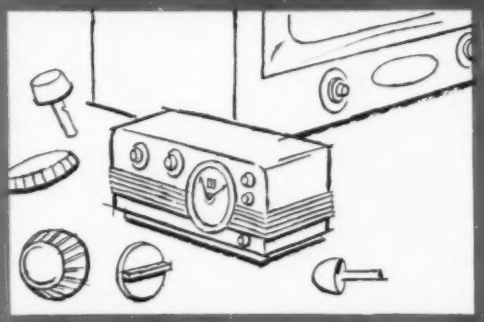
POLYPROPYLENE

NOW AVAILABLE IN COMMERCIAL QUANTITIES

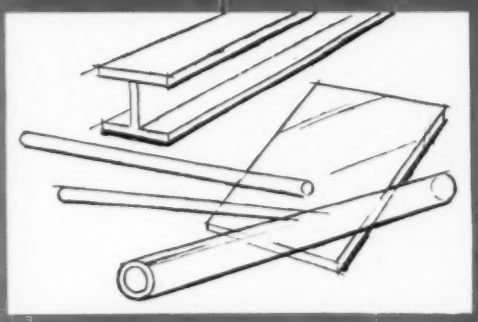
FOR PACKAGING – Escon film can be produced by water bath or chill roll technique with extreme clarity and gloss. It offers greater heat resistance than any other polyolefin and can be sterilized by heat or chemical means. In addition, Escon offers excellent stiffness and toughness. Escon clear film can be color printed on either side – or both sides – for that extra eye and buy appeal.



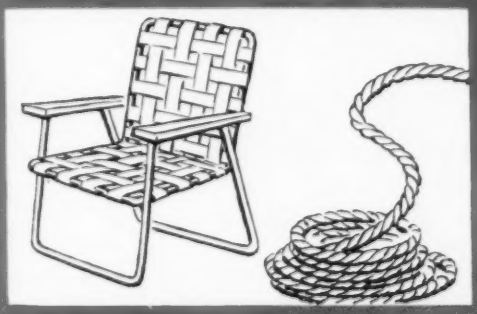
FOR MOLDING – Because of its light weight, Escon yields more pieces per pound. In injection molding, Escon's high strength, plus its unique chemical and abrasion resistance make it suitable for the manufacturing of many consumer products. Escon also allows accurate reproduction of fine patterns and intricate designs with high surface lustre.



FOR EXTRUDING – Escon may be extruded in an almost unlimited range of thicknesses and forms. Its excellent physical and chemical properties make it an ideal plastic for such operations as thermoforming, punching, machining, die cutting and welding. Surface details are accurately reproduced, too. And pigmentation, before or during extrusion, produces bright, even-colored sheet stock.



FOR FIBERS and MONOFILAMENTS— Again, the low density of Escon allows more yards of fiber per pound. Its high tensile strength, good knot strength and resilience, plus its immunity to attack by fungus, moths and marine organisms, make it ideal for ropes and woven fabrics. Ropes of Escon fibers show excellent wet strength, wet flexing durability, and abrasion resistance maintained in temperature range as low as minus 70°F.



TO ORDER ESCON, or for technical data, contact the nearest Enjay office. Enjay's extensive Plastic Laboratories and expert staff of technicians stand ready to help you achieve the most efficient use of Escon.

EXCITING NEW PRODUCTS THROUGH PETRO-CHEMISTRY

ENJAY COMPANY, INC., *15 West 51st Street, New York 19, N.Y.*

Akron • Boston • Charlotte • Chicago • Detroit • Los Angeles • Tulsa • New Orleans

ENJAY

PLASTICS

Flexural strength of polymethyl methacrylate at various deflection rates

By Richard E. Ely*

It is well-known that the mechanical properties of polymeric materials vary greatly with strain rate. Both tensile and compressive strengths normally increase greatly with rate when tested at a constant temperature. The compressive strength is usually the greater for a given set of test conditions. During bending, the material is subjected not only to tensile and compressive stresses, but also to a strain rate that varies with the depth in the beam. This rate must vary from zero at the neutral axis to some maximum rate at the extreme fibers of the beam. Flexural strength, therefore, is not readily predictable from strength data obtained by means of axial loads.

Flexural tests have been conducted with polymethyl methacrylate (PMMA) for deflection rates ranging from 0.02 to over 2000 in./min. The flexural properties thus determined are compared in this paper with high rate tensile and compressive properties. It should be stated, however, that no direct comparison should be made of the numerical results obtained from axial loads and bending loads, since for the latter the strain pattern or strain rate within the beam is unknown.

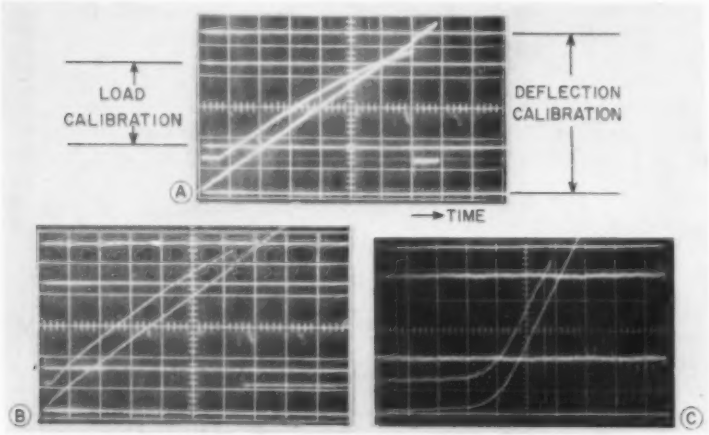


FIG. 1: Deflection-time and load-time curves for polymethyl methacrylate at a temperature of 74° F.

	Deflection rate (lower curve)	Maximum load (upper curve)	Fracture time
	in./min.	lb.	sec.
A	20.15	46.5	1.18
B	1.99	38.1	12.2
C	2110.	51.3	0.014

Test procedure

The thermoplastic beams, ¼ by ¼ by 6 in. long, were simply supported on fixed end supports and loaded at midspan. All forces were applied through ⅜-in.-diameter polished steel **(To page 199)**

*Research Laboratory, Ordnance Missile Laboratories Division, Army Rocket and Guided Missile Agency, Redstone Arsenal, Ala.

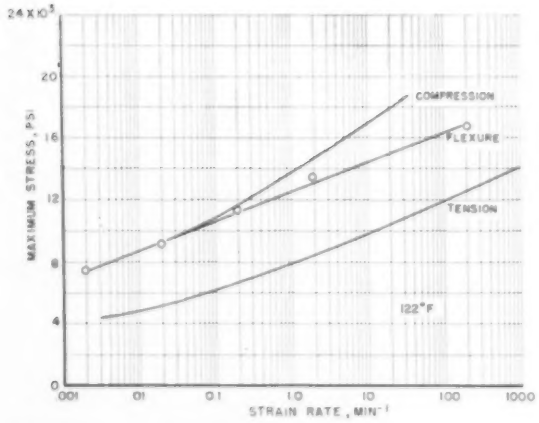


FIG. 2: Stress-strain curves for polymethyl methacrylate at 32° F.

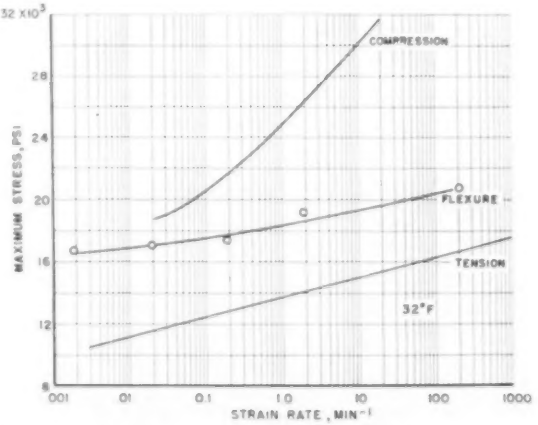
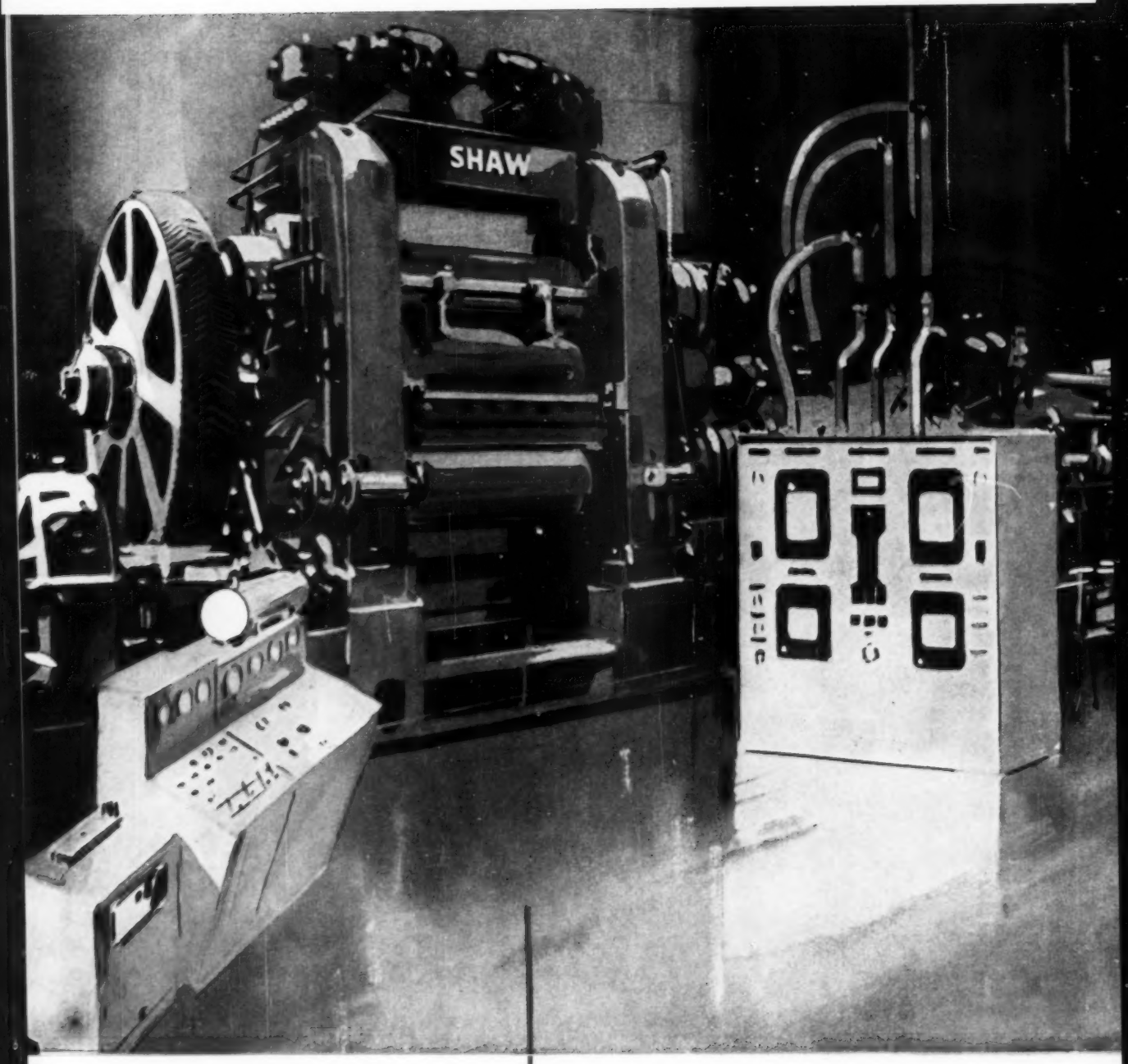


FIG. 3: Stress-strain curves for polymethyl methacrylate at 122° F.



Shaw Calenders for flawless production at minimum cost

Uniform Gauge ensured by

1. Roll bending (patented).
2. Independent motorised two-speed nip adjustment.
3. Hydraulically maintained zero clearance.
4. Flood lubrication.
5. Beta-ray recording and control.
6. Drilled rolls and heat exchanger for accurate temperature control.

Francis Shaw

FRANCIS SHAW & COMPANY LIMITED · MANCHESTER 11 · ENGLAND
Telegrams: "Calender" Manchester · Telephone: East 1415-8 · Telex: 66-357

London Office: 22 Great Smith Street London SW1 · Telephone: Abbey 3245 · Telegrams: Vibrate London · Telex: 22250
Canada: Francis Shaw (Canada) Ltd Grahams Lane Burlington Ontario · Tel: Nelson 4-2350 · Grams: Calender Burlington Ontario

OVERSEAS AGENTS THROUGHOUT THE WORLD

TRIULZI

PLASTMATIC range:

MODEL 40

Injection moulding machine for thermo-plastics, oil operated, self-contained, automatic, fast cycling.

Toggle clamping system
Injection capacity ..... 40 Grs
Working speed . 720 dry cycles per hour

PREPLASTMATIC range:

MODEL 1, 8/100/400

Injection moulding machine for thermo-plastics, oil operated, self-contained, automatic, fast cycling.

Equipped with preplasticizer
Injection capacity ..... 1800 Grs.
Plasticizing capacity ..... 100 Kgs/h
Working speed . 360 dry cycles per hour
Clamping force ..... 400 Tons
Useful space between the platens ..... 1300 mm.
Mobile platen stroke ..... 900 mm.
Platens dimensions .. 1060×1000 mm.

BLITZ range:

MODEL 70

Injection moulding machine for thermo-plastics, oil operated, self-contained, automatic, extra fast.

Equipped with in line preplasticizer
Toggle clamping system
Max. injection capacity ..... 250 Grs.
Plasticizing capacity ..... 40 Kgs/h
Working speed 1800 dry cycles per hour

This machine is particularly suitable for mass production of thin pieces.

PREPLASTMATIC range:

MODEL 140

Injection moulding machine for thermo-plastics, oil operated, self-contained, automatic, fast cycling.

Toggle clamping system
Injection capacity ..... 140 Grs.
Plasticizing capacity ..... 20 Kgs/h
Working speed 360 dry cycles per hour
Max. thickness ..... 500 mm.
Min. thickness ..... 250 mm.
Mobile platen ..... 280 mm.
Platens dimensions ... 575×575 mm.
Clamping force ..... 120 Tons

WATER-HYDRAULIC range:
MODEL 6, 5/230/1000 L

Injection moulding machine for thermo-plastics.
Equipped with preplasticizer
Automatic
Piston clamping system
Injection capacity ..... **6500 Grs.**
Plasticizing capacity .. 230 Kgs/h
Space between the platens **1900 mm.**
Mobile platen stroke ... **1200 mm.**
Platens dimensions **1440×1200 mm.**
Clamping force ..... **1000 Tons**

We manufacture both water and oil operated models with injection capacity **from 20 to 20000 Grs. and clamping force from 15 to 3000 Tons.**

We also manufacture:
- Presses for thermosetting materials
- Presses for plastic laminates
- Presses for polyester resins

O F F. TRIULZI S.A.S.

NOVATE MILANESE (Italy) VIA VIALBA 56 - TEL.3.491.661/2/3/4 - 3.491.785/6/7/8

Telegr.: TRIULZIPRES - NOVATE MILANESE

Pressures on objects embedded in rigid cross-linked polymers

By Glenn H. Dewey* and John O. Outwater†

It is shown that the experimental value of pressure between an object embedded in fully cured resin corresponds well with the theoretical value determined on the basis that the pressure is solely due to the effect of lowering temperature on two materials of differing coefficients of thermal expansion. This is also confirmed by use of the photoelastic effect.

It has long been suggested that there are very considerable pressures on the interior of cast resins and many attempts have been made to measure them (1, 2).[1] The origin of these pressures has, however, remained obscure and whether or not they decrease with time has remained a matter of speculation. To determine their origin, a hollow glass tube containing mercury was embedded in resin, a measuring device which would be valid over long periods of time and not be deflectable by the resin that was used. This led to a hypothesis that the pressure between a resin and an object embedded in it is due to the difference between the coefficient of thermal expansion of the resin and the object when they are cooled from a point below the heat distortion temperature of the resin.

A theoretical prediction of the pressure agreed well with the actual measured pressure. Various materials with different coefficients of thermal expansion were then embedded in resin to show by an examination in polarized light that stresses were always produced unless the material and resin had the same coefficient of thermal expansion.

Pressure measurement

In order to measure the pressure in a resin after cure, it was decided to modify an ordinary glass thermometer for use as a "null" pressure transducer. The top was cut off and connected to an oil pressure source so that the mercury column could be forced down to any desired level by varying the oil pressure. The actual temperature of the thermometer bulb was measured by a thermocouple embedded in the resin near the thermometer bulb. In this way we could then force the mercury down until its level was that that would indicate the actual temperature of the resin and in this case the pressure on both sides of the bulb would be the same. This gave us a simple method of measuring the pressure and one that we found would show reproducible results after it had remained untouched for a period of months.

We found that it was impossible to embed the bulb in unfilled resin as the resin in contact with the bulb cracked and gave us a spurious reading; however, by filling the resin with 20% 1/32-in. chopped glass fiber, it was possible to ensure the integrity of the resin and the readings were fairly easy to obtain; they were also reproducible.

The value of the pressure on a bulb embedded in an amine-cured Epon 828 resin[2] with 20% glass fiber varied with temperature and could be plotted as in Fig. 1, below. It was found also that the

[2]Shell Chemical Corp. epoxide resin.

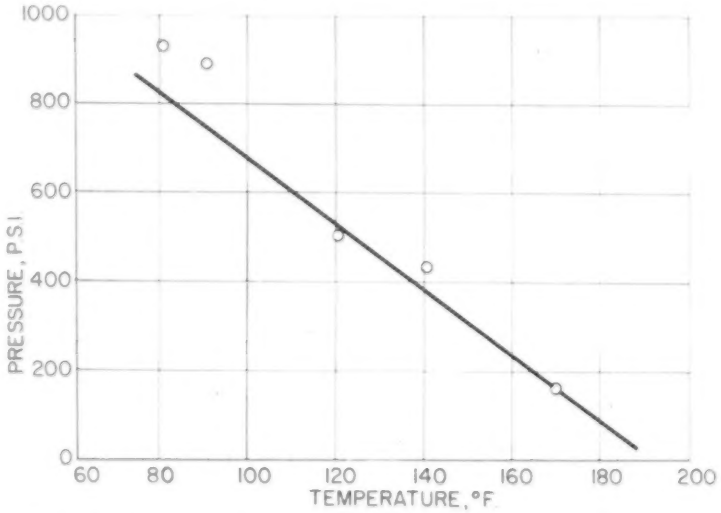


FIG. 1: Pressures (shown by o) exerted by Epon 828 with 20% glass filler on 1/4-in.-diameter glass rod at different temperatures. The line shows the theoretical values of pressures calculated from

$$p = \frac{E}{1.16}(K_p - K_n)\,\Delta T$$

where $E = 6.7 \times 10^5$ p.s.i., $K_p - K_n = 1.28 \times 10^{-5}$ in./in./°F. and temperature is measured from 190° F.

*Graduate student in Mechanical Engineering, University of Vermont, Burlington, Vt.
†Professor of Mechanical Engineering, University of Vermont, Burlington, Vt.
[1]Numbers in parentheses link to references at end of article, p. 205.

working with

Du Pont Alathon®

polyethylene resins

one of Du Pont's versatile engineering materials

Exacting service in water softener proves ALATHON® superior to materials formerly used

Parts molded by Contour Plastics, Minneapolis, Minnesota, for the Lindsay Company, Division Union Tank Car Company, St. Paul, Minnesota.

Water-softener parts must withstand the corrosive attacks of whatever salts and minerals are present in the water they handle. The use of Du Pont ALATHON polyethylene resins in the water softener shown above insures long, trouble-free performance in brine and turbid water. The refill regulator and brine-well cover and bottom are molded of ALATHON. These parts of ALATHON will not change shape even in prolonged and difficult service.

In the funnel adaptors, ALATHON offers an optimum balance of flexibility and rigidity: the adaptors are flexible enough to fit slight variations in standard funnels, yet rigid enough to support the funnel and the material loaded through it.

According to the Lindsay Company, manufacturers of automatic water softeners, field experience to date has definitely demonstrated the superiority of ALATHON over the non-ferrous metals previously used in these applications.

In an astonishing variety of products, designers have found that the family of ALATHON polyethylene resins offers unique opportunities for product improvement and lower service costs. On the following page you will find more cases in point.

DU PONT

REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING

. . . THROUGH CHEMISTRY

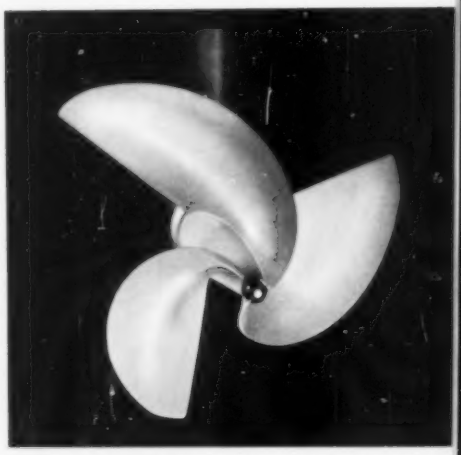
working with

Du Pont Alathon®

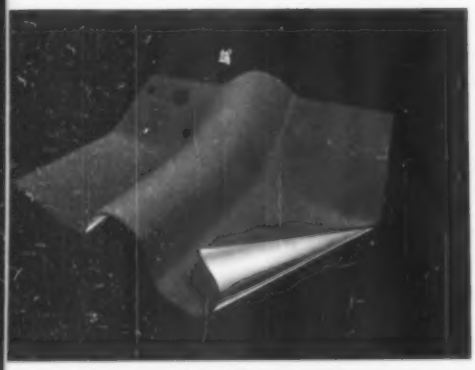
polyethylene resins

one of Du Pont's versatile engineering materials

Mechanical, chemical, electrical properties of ALATHON® make possible varied design improvements



Propeller for water meter is molded of lightweight ALATHON 10 to reduce bearing and load wear. The flexible propeller throws off foreign materials, minimizes fracturing. The resistance of ALATHON to chemical and electrolytic action assures long service. (By Hersey-Sparling Meter Co., El Monte, Calif.)



Auto carpeting is backed with 15-mil coating of ALATHON to permit preforming, thus saving the time and expense of cutting and fitting carpet necessary with other backings. (By Collins and Aikman, New York, N.Y.)

Cable insulation and jacketing of ALATHON takes advantage of the high dielectric strength of these resins, plus their resistance to moisture and chemical attack. Use of ALATHON frequently permits smaller over-all cable diameters and smaller conduits, saving space and reducing installation costs. (By Anaconda Wire and Cable Co., New York, N. Y.)

Illustrated here are only a few of the hundreds of cases in which imaginative designers have put ALATHON to work for them. Perhaps they will suggest ways that you can profitably use these versatile materials. Du Pont offers an entire family of ALATHON polyethylene resins, each formulation tailored to meet a specific need. For more information about ALATHON in the form of moldings, coatings or extrusions, consult your supplier, or mail the coupon below, indicating the use you have in mind.

POLYCHEMICALS DEPARTMENT

DU PONT

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

E. I. du Pont de Nemours & Co. (Inc.)
Department 1345, Room 2507-A
Nemours Building, Wilmington 98, Delaware

I am interested in evaluating ALATHON for the following use:

_____

*Name*_____

*Company*_____ *Position*_____

*Street*_____

*City*_____ *State*_____

ALATHON®

polyethylene resins

one of Du Pont's versatile engineering materials

Zytel® · Delrin® · Lucite®

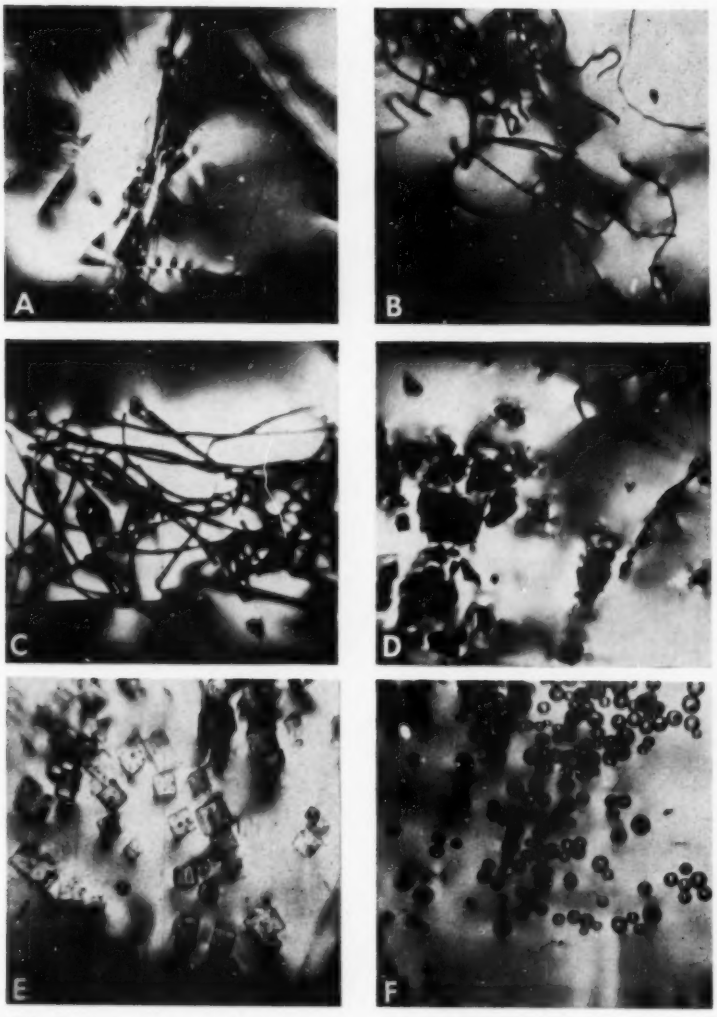


FIG. 2: Materials embedded in Laminac 4116 and how they appear when viewed in polarized light. **A**—Glass fibers. **B**—Steel wool. **C**—Aluminum wool. **D**—Selenium metal with an aluminum filler. **E**—Sodium chloride crystals. **F**—Polymethyl methacrylate.

Table I: Coefficients of thermal expansion of material embedded in polyester

Material	*Coefficient of thermal expansion* 10^{-6} in./in./°F.
Glass fibers	4.72
Steel wool	7.37
Aluminum wool	12.8
Selenium	20.5
Sodium chloride	22.5
Polymethyl methacrylate	60.0

pressure only developed after a postcure but, once it had been developed, it was "permanent" and did not change over a period of eight months. The pressure could be reduced to zero by bringing the temperature of the whole assembly up to 190° F., but it was found that it would reappear unchanged on cooling.

Pressure hypothesis

This linear nature of the pressure together with its persistence suggested that it might have thermal origins, so the following hypothesis was evolved to show the interaction of the resin and an object embedded in it: The pressure on an object embedded in a fully cured resin results solely from the differential thermal shrinkage of the resin compared to that of the object from a certain value of temperature which depended on the nature of the resin involved.

This hypothesis fitted in well with the above experiment, and it was decided to show that it would result in the same pressures if it were used as a basis for a theoretical determination of the pressure on embedded object.

Theoretical determination

If we assume that the embedded object is in the form of a rod of small diameter compared with that of the resin in which it is cast, then we can use the well known formulae for the pressures on thick cylinders to account for the intense pressure. From Timoshenko(3) we get the relationship for the displacement of the inside diameter of a plastic cylinder around a rod as follows:

$$p = \frac{U}{\frac{d}{2E}\left\{\frac{D^2 + d^2}{D^2 - d^2} + \mu\right\}}$$

where p is the pressure, d is the diameter of the embedded rod, D is the diameter of the resin mold, E is the elastic modulus of the resin, μ is the Poisson's ratio of the resin, and U is the radial displacement of the inside surface of the cylinder due to the pressure on its interior.

Now the actual displacement of the inside surface that has to be accomplished by the pressure is the difference between the expansion that would occur to the rod and resin by thermal effects alone, or expressed mathematically:

$$\frac{d}{2}(K_p - K_o)\,\Delta T$$

where K_p and K_G are the coefficients of thermal expansion of the resin and of the embedded rod, respectively, and ΔT is the temperature drop under consideration. Combining these equations we get:

$$p = \frac{E\,(K_p - K_o)\,\Delta T}{\frac{D^2 + d^2}{D^2 - d^2} + \mu}$$

Now if we consider that the rod is small in diameter compared to the extensive resin in which it is embedded, then $(D^2+d^2)/(D^2-d^2)$ approaches unity, and if we take a value of 0.16 **(To page 205)**

Toy Rocket Body — The great power of the Fellows injection side made possible the successful molding of this part. Tough to mold, super-high-impact styrene had to flow up a 23" total push through pin-point gates.

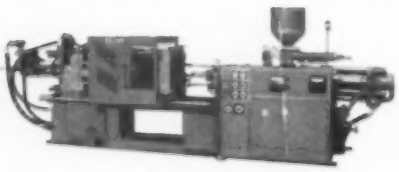
Waste Disposer Housing — A high-speed 13-ounce shot that most 12-ounce machines can't handle so fast or so well.

Seat Cover — Fellows 12-350 machine maintains high quality standards not possible with other 12-ounce machines.

Polyethylene Locomotive — 19 ounces of linear polyethylene. This is the largest linear shot ever made by I.M.C. using a 12-ounce machine.

Couplings — Wide range of controls on Fellows 12-350 holds precise tolerances and avoids stressing the parts.

FELLOWS MACHINES MOLD THE "TOUGH ONES"!



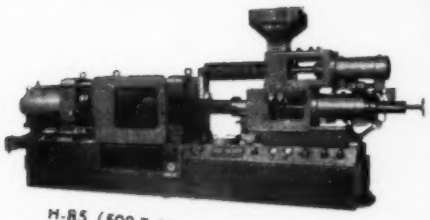
Industrial Molding Corporation, Culver City, California molded all these parts on their Fellows No. 12-350 injection molding machines. Can we help you on your tough molding problems? Your Fellows representative will be pleased to give you complete information.

Fellows

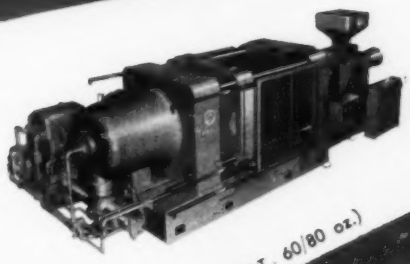
injection molding equipment

THE FELLOWS GEAR SHAPER COMPANY, 78 River Street, Springfield, Vermont, U.S.A. • Branch Offices: 1048 North Woodward Ave., Royal Oak, Mich.; 150 West Pleasant Ave., Maywood, N.J.; 5835 West North Avenue, Chicago 39; 6214 West Manchester Ave., Los Angeles 45.

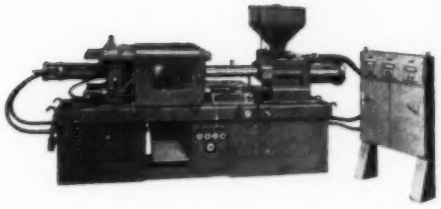
MEIKI



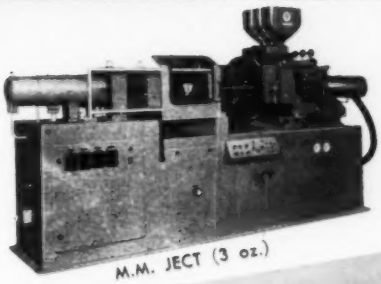
H-85 (500 T-80 oz. WITH PREPLASTICIZER)



H-180 (1200 T - 60/80 oz.)



MEIKI-REED-PRENTICE (4/6 oz.)



M.M. JECT (3 oz.)

MEIKI offers all sorts of Injection Molding Machines, covering the range of 2 - 600 oz., including the following standard types:

1. Fully-hydraulic, fully-automatic
   - * H-180 (1200 T - 60/80 oz., 200 oz. with preplasticizer)
   - * H-120 (700 T - 40/52 oz., 140 oz. with preplasticizer)
   - * H-85 (500 T - 20/28 oz., 80 oz. with preplasticizer)
   - * H-55 (300 T - 12/16 oz.)
   - H-35 (200 T - 8/10 oz.)
   - H-16 (80 T - 3/4 oz.)
   - H-8 (40 T - 1.5/2 oz.)

   (* Oilgear pumps and accessories available)
2. Toggle clamping, MEIKI-REED-PRENTICE
   - 175 T - 4/6 oz.
   - 300 T - 12/16 oz.
3. Other special types
   - Hi-ject® series (High-speed molders)
   - M.M. JECT® (Multi-cylinder for multi-color)
   - Viny-ject® (for hard vinyls)
   - etc. (® Reg. Trade Mark)

MEIKI

MEIKI CO., LTD.

1, 2-chome, Shioiri-cho, Mizuho-ku
Nagoya, Japan
Cable: MEIKILTD NAGOYA

NEW DEVELOPMENTS

Many minds at work on new ways to use plastics, new designs, and new product concepts offer ideas you can use.

Disposable footwear

Throw-away polyethylene boots, following the success of disposable PE gloves (MPI, Nov. 1958, p. 137), are providing economic solutions to several industries. Plasticsmith Inc., Pittsburg, Calif., designed the boot primarily for use by technicians in

biological and atomic laboratories where control of spread of contaminating elements is vital. However, since then, large rug cleaning outfits that do in-home work have adapted the boot as a means of keeping the customer's house clean. Several other industries also have the product under consideration.

The boots are designed to be pulled on over the wearer's regular shoes and can be worn open at the top or closed with a rubber band or paper clip. They are water tight, last for several hours under normal conditions, and then are easily slipped off to be discarded.

Called Footgards, they are fabricated from conventional low-density polyethylene film by a hot wire heat-sealing process in a rotary production technique. They are packed in rolls of 50 to 100 boots per roll, and are available in two gages: 0.00175 and 0.003 inch. The 0.00175-in. boots list at about 6½¢ each, the heavyweight boot at 9½¢ each.

Footgards are available in large sizes only, to fit up to size 10 in a man's shoe, but can be made in other sizes as required.

Tooling for short runs

For some semi-production or short-run jobs, even the low cost of cast or laminated epoxy tooling may be prohibitive. Now a new technique has been developed whereby an epoxy surface can be applied to a base consisting of conventional "hard plaster" or high-strength gypsum cement such as is widely used in pattern making.

Recently announced by United States Gypsum Co., Chicago, Ill., the new technique is called the "plastic faced plaster system." It takes advantage of the 5 to 6¢/lb. cost of gypsum cements and the extreme surface hardness of epoxies.

To produce a tool, the model is first waxed and sprayed with a mold-sealer and separator. A surface coat of epoxy resin is then brushed uniformly over the model. Next step involves a special spray gun that can project metal fibers 1/16 to ⅛ in. in length—copper, steel, and aluminum have been used—into the still-wet epoxy surface so that the fibers are both embedded in the epoxy and also project above the plastic surface. After the epoxy has cured, a brush coat of gypsum is applied and the plaster backing is poured in place. Separation takes place after the plaster has developed sufficient strength for handling.

U. S. Gypsum states that this "plastic faced plaster system" has been successfully used for production of Keller patterns, thermoforming molds, short-run foundry patterns, stretch press blocks, etc.

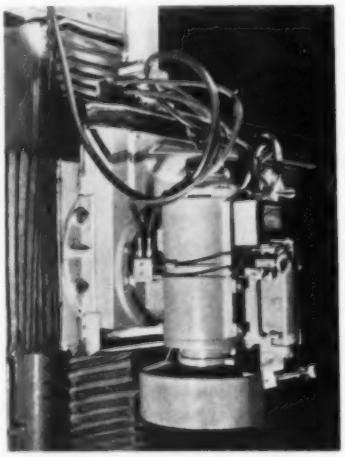
Nylon for pressure tubing

Installation of specially processed nylon tubing as flexible hydraulic lines for multiple-head vertical grinders has resulted in important improvements and cost savings for the Frauenthal Div., The Kaydon Engineering Corp., Muskegon, Mich. The nylon tubing—Type H Nylaflow pressure tubing—is made by the Polymer Corp. of Pa., Reading, Pa.

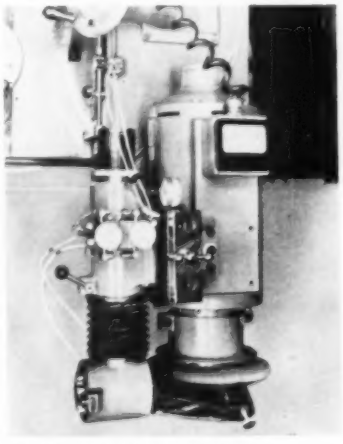
The big problem with the old braided hose and metal tubing was that of the heavy, ungainly lines draping over the machines and interfering with the controls. Nylaflow tubing is lightweight (2.44 lb./100 ft. in the ¼-in. I.D. as compared to 18 lb./100 ft. in the comparable rubber braided hose); and although it can be easily bent when desired, it is a "stiff" material which assumes a clean, neat, symmetrical curve between fittings.

Nylaflow tubing is approximately 40% smaller in OD than the same ID braided rubber hose, and has a short time burst pressure rating of 2500 p.s.i. under normal conditions.

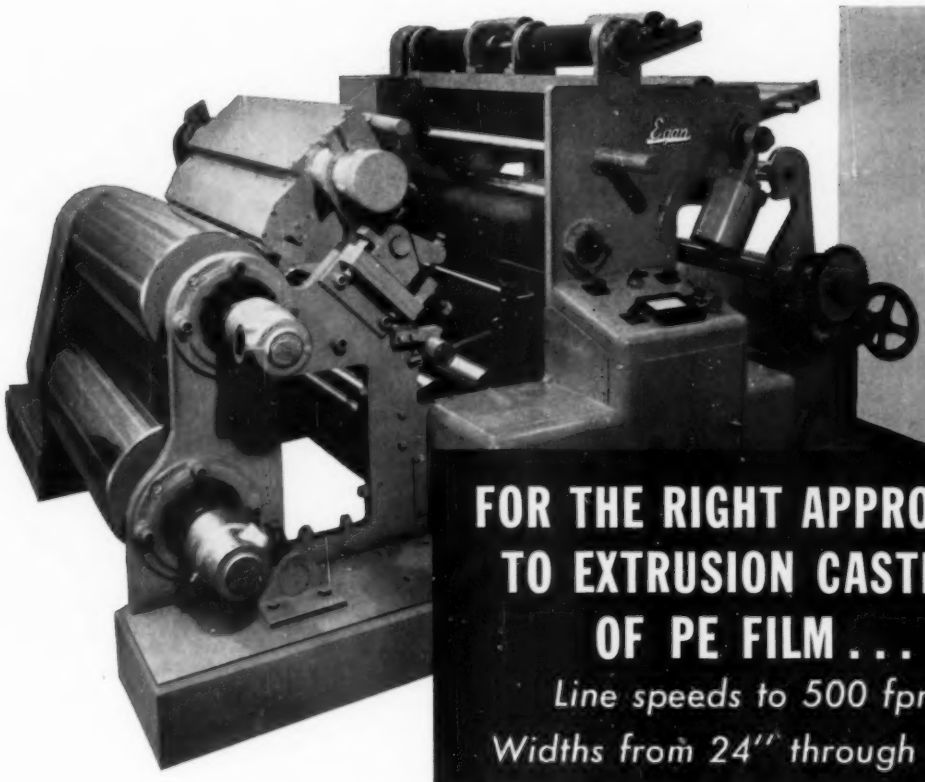
Cost reductions amounted to 70% in tubing alone. (¼-in. OD Type H Nylaflow rated for operating pressures of 625 p.s.i. costs 6¢/ft.; the equivalent rubber hose **(To page 150)**



BEFORE: Wheel dresser uses both braided hose and metal tubing, requiring different connections. Note bulkiness of the system.



AFTER: Standard compression fittings normally used with metallic tubing are used with nylon tubing. Lines are run and the connections are made with simple hand tools.



FOR THE RIGHT APPROACH TO EXTRUSION CASTING OF PE FILM . . .

Line speeds to 500 fpm

Widths from 24" through 120"

It pays to rely on Egan precision engineered equipment for completely packaged extrusion casting installations!

EGAN FILM CASTING UNITS include these features: highly polished, chrome-plated casting rolls with spiral baffling for even temperatures; a specially designed air-knife with an adjustable assembly for controlling "frost line" and assuring uniform film contact across full face of roll; edge trimmer assembly; trim disposal system; turret type winder with electronic drive for each winding position to provide programmed tapered tension, and web cut-off and transfer at operating speeds.

EGAN HEAVY DUTY EXTRUDERS have been tested and proven in the field! These dependable, high-capacity, low maintenance units are available in sizes from ¾" through 10". Economical ceramic heater bands provide fast heat-up time and operating economy. The overall extruder components assure closer tolerances and uniform gauge. For absolute control of heating, cooling, and excessive frictional heat, the patented "Willert Temperature Control System" may be included. Complete instrumentation is included.

EGAN DIES for cast film installations are of the manifold type with provision for die blade adjustments. Heaters are divided into separate zones with individual pyrometer type controls. The main die body, in conjunction with a specially designed 45 degree adapter, is arranged so the casting rolls can be moved close to the die orifice.

Egan

CABLE ADDRESS: EGANCO—SOMERVILLE (NJER)

FRANK W. EGAN & COMPANY

SOMERVILLE, NEW JERSEY

Manufacturers of plastics extruders, dies, take-offs, and other accessories

REPRESENTATIVES: MEXICO, D. F.—M. H. GOTTFRIED, AVENIDA 16 DE SEPTIEMBRE; JAPAN-CHUGAI BOYEKI CO., TOKYO. LICENSEE: GREAT BRITAIN-BONE BROS. LTD., WEMBLEY, MIDDLESEX.

(From page 148)

costs about 22 to 25¢/ft.) Reductions in installation time and fittings were also appreciable. The nylon tubing can be cut to the proper length, cold flared, bent and connected right on the spot, permitting the assembly to move forward. The tubing can be used with practically any metallic fitting commonly used with copper and steel tubing.

Hose by the foot

Visitors recently returned from Europe have commented on the fact that vinyl garden-hose there is sold at retail from continuous rolls in any desired length.

Thanks to a nylon coupling developed by W. D. Allen Mfg. Co., Bellwood, Ill., the same system has now been introduced in this country. The coupling can be attached in just one minute, while the customer waits.

Montgomery Ward & Co.'s Lawn and Garden Dept. has adapted the coupling for in-store sales, allowing the customer to name any length up to 500 feet. The hose is sold directly from large reels and cut and coupled on the spot. Formerly all garden hose was sold in lengths of 25, 50, 75, and 100 feet. The couplings are made of Du Pont Zytel.

One piece replaces eight

By redesigning a terminal plate to take advantage of the composite structure of copper-clad phenolic laminate, a manufacturer of electric beacons has replaced an eight-part assembly with one piece of the laminate. In the original design, the terminal plates were made by fastening two metal disks to a piece of standard laminate with four rivets. The new plates are made simply by machining a circular gap in the face of copper-clad laminate, achieving the required electrical end by a rapid, inexpensive process.

The terminal plates are being made by U-C Lite Mfg. Co., Chicago, Ill., for its line of hand electric beacons, using copper-clad Phenolite laminate supplied by National Vulcanized Fibre Co., Wilmington, Del. The beacon manufacturer reports a saving of 5¢ in labor cost on each lamp through this pioneering use of a material that was originally developed for use in printed circuits.

Family water bicycle

A new plastics version of the water bicycle, long popular for commercial rides at summer resorts and amusement parks, is less expensive and lighter than previously used models.

The old types were generally made by attaching wooden pontoons and a large wooden paddle wheel to an ordinary steel bike frame. Prices generally ran from $300 to $500. The new water bike retails for approximately $130, and weighs just 51 pounds. According to the manufacturer, Argo Industries Corp., New York, N. Y., the vehicle will support up to 250 lb. with safety and stability.

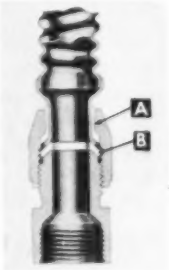
An aluminum-frame bicycle is mounted on a pair of aluminum-skin floats filled with expanded polystyrene foam supplied by Dow Chemical Co. Each float consists of two 4-ft. lengths, 1 ft. wide and 6 in. thick, bolted together. For carrying and

storing, the bicycle can be separated from the floats, and the float sections dismantled, by removing wing nuts located on the float undersides.

Two sets of gears, one for the bicycle and one for the screw-type propeller beneath the water, are injection molded of Du Pont Zytel nylon, providing rustproof parts that never need oiling. Gears are molded by Progressive Plastics Mfg. Corp., New York, N. Y.

PE for pipe unions

A flexible copper pipe connector with a built-in polyethylene union promises to prevent electrolytic corrosion of copper and steel elements in both hot- and cold-water pipe systems. In addition, the new coupling, called Waterflex, is said to save up to 65% in installation time by eliminating nipples, elbows, and swing joints.



The polyethylene union (A and B in photo) is injection molded in two parts—seat and sleeve—of Koppers high-density Dylan by Peerless Plastics, Culver City, Calif., for Central D Mfg. Co. By separating the metallic parts of the coupling, the polyethylene units effectively stop galvanic currents which would lead to corrosive action. The coupling is stated to withstand hydrostatic pressures of over 2000 p.s.i.

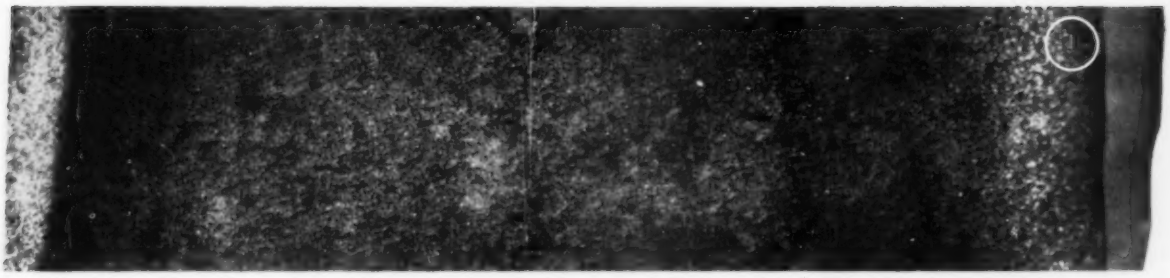
Molded RP window sills

Worn indoor window sills can be easily renovated by the home owner using a durable, decorative molded surface of reinforced plastics.

The molded sill covering, available in wood grain or marble patterns and called Hartsil, is made by Hartglas Co., Toledo, Ohio using Plaskon polyester resin from Allied Chemical Corp., Plastics & (To page 152)

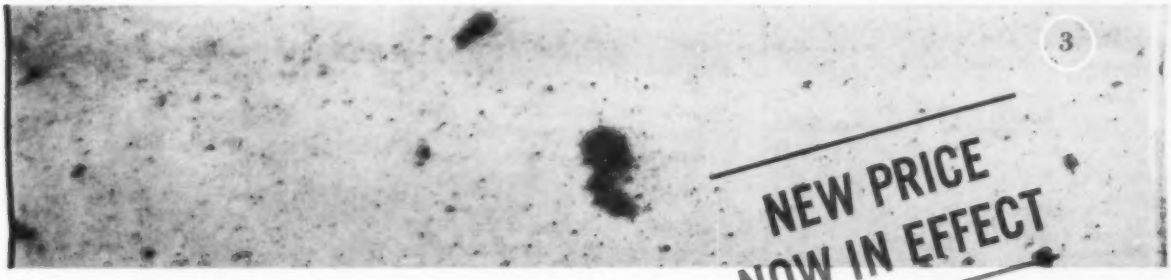
TERMINAL PLATE made of single piece of copper-clad laminate (right) replaces eight-part assembly (left), which has two metal disks, four rivets, and a piece of plain laminate. Labor costs for the assembly were reduced 5¢ per unit by the new design.

Dirt pick-up test proves



superior migration resistance of

Eastman Polymeric Plasticizer NP-10



in vinyl compounds

1/ *Vinyl film containing polymeric plasticizer A*

2/ *Vinyl film containing polymeric plasticizer B*

3/ *Vinyl film containing Eastman Polymeric Plasticizer NP-10*

These three photographs show the results of exposing vinyl films to sun and weather for a period of six months.

The top two samples are plasticized with ordinary commercial polymeric plasticizers, the lower one with Eastman Polymeric Plasticizer NP-10

The two vinyl films containing Plasticizer A and Plasticizer B show excessive dirt pick-up resulting from migration of the plasticizer to the surface of the film. The vinyl sample containing NP-10 shows virtually no dirt pick-up.

Superior migration resistance is only one of the permanence characteristics contributed to vinyls by NP-10. Its loss from vinyl films to hydrocarbons, soapy water and activated charcoal is also extremely low. It is highly resistant to hydrolysis. Thus, vinyls containing NP-10 can be expected to retain their plasticity under the most severe conditions for long periods of time.

In spite of these outstanding permanence characteristics, NP-10 is not a high-molecular-weight material. Consequently, it blends easily and rapidly, permitting vinyl compounders to maintain efficient production schedules.

This combination...ease of processing with maximum permanence...makes NP-10 an ideal plasticizer for many vinyl applications. We invite you to investigate its performance in your own formulations. For samples of NP-10, write EASTMAN CHEMICAL PRODUCTS, INC., subsidiary of Eastman Kodak Company, KINGSPORT, TENNESSEE.

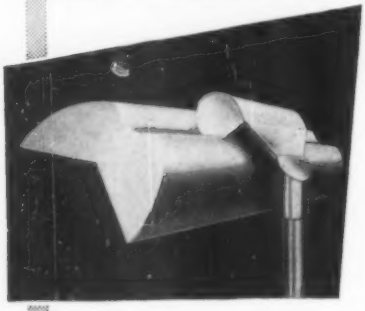
The test: *Samples of vinyl film, each containing 50 parts of plasticizer per hundred parts of resin, were prepared using three different polymeric plasticizers. The test samples were exposed for six months on a weathering fence inclined at 45 degrees to the south. At the end of the test period, surface of film was observed for degree of dirt pick-up.*

SALES OFFICES:

Eastman Chemical Products, Inc.,
Kingsport, Tennessee; Atlanta; Chicago; Cincinnati; Cleveland; Detroit; Framingham, Mass.; Greensboro, N. C.; Houston; New York; St. Louis.

West Coast: Wilson Meyer Co.,
San Francisco; Los Angeles; Portland; Salt Lake City; Seattle.

Another product
made better
with MOLDED
FIBER GLASS



It's a street light housing

for the new Westinghouse
Mainstreeter
Fluorescent Luminare

. . . weather resistant, won't rust, rot or corrode

. . . tough, resistant to hail, wind, mechanical damage

. . . lightweight, rigid, easy to mount

. . . molded-in color requires no painting

. . . smooth, modern, streamlined — custom molded to Westinghouse designs

. . . and economical!

Do you have a product which can be made *better*, at less cost, with MOLDED FIBER GLASS? Write today. Free literature available.

Molded Fiber Glass Company

GREATEST NAME IN REINFORCED PLASTICS — MOLDED FIBER GLASS

4413 Benefit Avenue, Ashtabula, Ohio

Coal Tar Chemicals Division, and the fibrous glass is supplied by Owens-Corning Fiberglas Corp.

To form the item, a layer of fibrous glass-reinforced polyester resin, a sheet of decorative, resin-impregnated porous paper, and another layer of resin and fibrous glass are molded under vacuum, followed by heat and pressure. The resultant 0.030-in. thick sill covering is weather, stain, and abrasion resistant. Chemical and wear resistance are comparable to the marble it simulates.

Installation of the new surfacing requires only sanding of the original wood sill, and applying Hartsil with a plastic wall tile adhesive. Hartsil is available in 35 and 53-in. lengths and $1\frac{1}{16}$ in. width.

Because distribution channels have not been completely set up, list prices are not yet available for publication.

Cellulosic fire globes cut replacement cost

Use of butyrate instead of glass for fire globes in the boroughs of Brooklyn and Queens, New York City, has cut the replacement rate by 50 to 75 per cent. Mounted on the street light poles next to fire alarm boxes, the globes mark the intersections at which the boxes are located.

The butyrate globes, 12 in. in diameter with 6-in. fitter holes, were first put into use about four years ago by The Welsbach Corp., street lighting maintenance contractors, and have since then been used to replace the glass globes as the latter are broken. The system is expected to be completely converted to butyrate globes within a year.

The globes, manufactured by A. L. Hyde Co., Grenloch, N. J., are molded in two pieces and then welded together with solvent cement. They are attached to the lighting fixtures by set screws.

In New York City, 32-w. lamps are used to illuminate the globes, since their purpose is only to call attention to the fire box and not to give any street light. Up to 115 w. may be used, if desired.

In addition to the reduction in breakage after installation, it was noticed that because of the toughness of the plastic there is virtually no accidental breakage by maintenance crews, either while the globes are being transported to the job, while they are being installed, or when light bulbs are being changed.

Long service life seen for fibre basket

An improved version of the Kennett vulcanized fibre check-out basket, with sewn vinyl bindings at top and bottom edges, can be expected to last indefinitely under normal handling, according to the manufacturer, National Vulcanized Fibre Co., Wilmington, Del.

Widely used in self-service grocery, drug, and variety stores, the baskets list for $3.60 in quantities of 100. This price and their long life compare favorably with canvas baskets, which cost about 20% less but only last about six to eight years in similar application areas.

The hard surface of the fibre baskets will not scratch, dent, or stain, according to NVF; and with the new vinyl bindings there is no problem of marking counter tops. Available colors are gray, black, red, and green, all in an embossed design.

Each basket weighs 2 lb., and measures $16\frac{3}{4}$ by $9\frac{1}{2}$ in. at the top, tapering to bottom dimension of $15\frac{1}{2}$ by $7\frac{1}{4}$ inches. The tapered construction permits compact stacking when the baskets are not in use. The vinyl bindings are made by Pawling Rubber Co., Pawling, N. Y.

Styrene foam mannikins

Full-form mannikins for retail store displays are molded of Koppers Dylite expandable polystyrene,

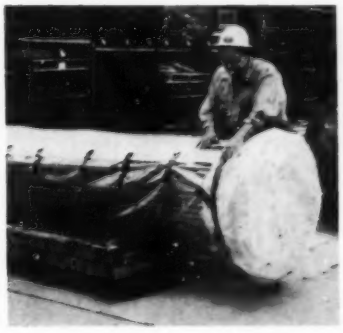
weigh only 2¼ lbs., and are said to be virtually indestructible. Molder is Zant Terrace Plastics Inc., Los Angeles, in conjunction with Decter Mannikin Co., Los Angeles. They are available exclusively through Rose Marie Reid Inc., who will feature them in displays of its 1960 swim suit line. (For expandable polystyrene in blouse and sweater display forms, see "Display shell," MPI, Sept. 1958, p. 190).

PE 'bag' for metal storage

Time and cost savings have been achieved by the Esso Standard Oil Co. refinery in Linden, N. J. by using polyethylene film to protect bundles of carbon-steel heat exchanger tubes from rust and corrosion during storage. A double wrap of 6-mil high-density polyethylene film is wrapped around the steel tubes, end pieces are placed on both sides of this bundle, and the "bag" is sealed, using a new high-tack polyethylene tape.

The film, Visqueen, is supplied by the Visking Co., Div. of Union Carbide Corp., Chicago, Ill. Visking also supplies the polyethylene tape.

According to Esso, this procedure (which replaces the use of spray-on vinyl and gauze wrapping) has reduced the labor and material cost of wrapping one bundle of tubes from $150 to $20! The film, which



costs 2 to 3¢ per sq. ft., provides lasting protection and resistance against acids, alkalies, and caustics.

Esso is using both black and clear Visqueen film. Black is recommended where the bundle is to be stored out of doors.

Foam ice bucket

The Magikeeper polystyrene foam ice bucket is priced considerably less than conventional buckets, yet is said to have insulating properties superior to even the most expensive.

The product, consisting of bucket and matching lid, will hold up to 5 qt. of ice for from 24 to 48 hours. Even with the lid off, it will keep ice overnight. It retails for $2.95, weighs approximately 5 oz. and comes in speckled confetti colors. Molder and marketer is Aeroplastics Corp., Venice, Calif.

Prior to the molding operation, Dylite beads, supplied by Koppers Co., are partially expanded to a controlled density. They are placed in aluminum molds (one for the base, the other for the cover) and the molds in turn placed into a

steam chest. Steam enters the molds through small openings in the mold surface, expands the beads fully, and fuses them together into a solid mass. The molds are then cooled and the finished pieces removed.

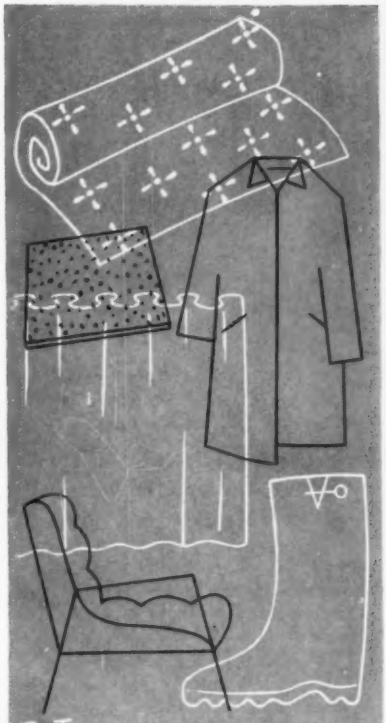
Nylon for motor housing

Portable electric can opener, with a motor housing molded of nylon-6, is said by the material supplier to be indicative of a growing market for nylon molding compounds in the appliance industry.

Nylon-6 was selected for the application because of its balance of such properties as high impact strength, superior surface appearance, and ease of processing. In addition, the material conforms to the Underwriters Laboratories specifications for self-extinguishing plastics materials.

The can opener is manufactured by Supreme Products Corp., Chicago, Ill., and retails for $16.95. It is 8½ in. long, with the white nylon motor casing comprising about 5 in. of this length.

The nylon housing consists of two individual shells weighing approximately 1 oz. each, which are joined by screws. Parts are injection molded by Plano Molding Co., Plano, Ill., using (To page 154)

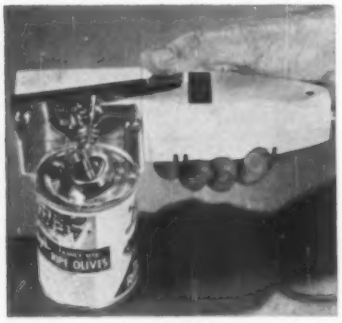


Nacromer®
SYNTHETIC PEARL ESSENCE
BRINGS OUT THE
Beautiful
BEST IN
Vinyls

Many manufacturers and processors of vinyl films and calendered sheeting have already discovered that Nacromer adds immeasurably to the beauty of their products. By creating an entirely new character for the plastic, or by highlighting surface effects, Nacromer is finding effective use in upholstery and drapery fabrics, wall coverings, floor tiles, rainwear, footwear and shoe accessories, and many other products. Incorporated directly into the plastic or used as a coating, Nacromer may improve the visual appeal of your product too. Are you ready to try it?

FREE 8-PAGE HANDBOOK
This valuable guide to the use of natural pearl essence and synthetic pearl pigments is yours for the asking.

THE MEARL CORPORATION
world's leading producers of pearl essence



an 8-oz. Reed-Prentice machine. Molding material is from Spencer Chemical Co., Kansas City, Mo.

2 1/2-ton load for urethane tire

Urethane elastomer tires on special roller guides are important load-carrying components of the dollies used to assemble, check out, as well as transport the Army's Nike Hercules missiles.

When the missile is placed in the dolly cradle and rotated for mechanical and electrical checking, the polyurethane tires absorb the full 2½-ton load. The tires, a product of Disogrin Industries Inc., Mt. Vernon, N. Y., have reportedly shown no noticeable deformation or permanent set since their initial use in February 1959. In addition, the elastomer tires do not mark or scar missile surfaces.

Rubber treads previously tested peeled off roller guide hubs because of failure of the bonding material under the heavy load. The rubber also developed permanent flat spots and deformed under load. Aluminum surfaces were then tried and rejected because they marked and scored areas where they came into contact with the missile.

. . . And in brief

• Molded nylon retainer (Plastics & Coal Chemicals Div., Allied Chemical Corp.) for steel ball bearings is used by Rampe Mfg. Co., Cleveland, Ohio. Retainer, upon being assembled, becomes trust bearing of a worm gear reducer.

• Life-size mallards molded of Dylite expandable polystyrene (Koppers Co. Inc.) by Robin Mfg. Co., Markesan, Wis., make decorative three-dimensional wall plaques. $16.95 a pair from manufacturer, Hunter Supply Co., Mankato, Minn.

• Heavy-duty liner fabricated of 20-mil PVC has round bottom to fit 55-gal. steel drums, is suggested for storage of sodium hypochlorite, plating chemicals, heavy caustics, etc. Claimed temperature range is 25 to 230° F. Made by DOR Plastics Corp., a division of Protective Lining Corp., Brooklyn, N. Y.

• Lenses for optical system in manned space capsule of Project Mercury are specified in CR-39, an allyl ester sheet. Lenses are 8 in. in diameter, weigh less than half as much as glass, thus resulting in several hundred pounds of fuel saving. Designed by Perkin-Elmer Corp., made by The Polycast Corp., Stamford, Conn.

• Base and base support of new Dormeyer blender are molded of acetate by Plastic Precision Parts Co., Chicago, Ill. The material, supplied by Eastman Products Inc., was chosen for its range of color, toughness, and low heat conductivity.

• Tubes of clear vinyl, joined together in tape-like form for low pressure fluid distribution systems are now made by Jessall Plastics, Div. of The Electric Storage Battery Co., Kensington, Conn. Individual tubes can be stripped from main body at any point. Stock sizes range from 1/32 to ¼ in. I.D., in lengths of 100 feet.—**End**

for
DUST-FREE
SALES APPEAL
it's

SPECIFIED BY MEN WHO KNOW!

Gal. Conc. #79 $8.50
5 Gal. Conc. #79 Gal. only $7.57
32 Gal. Conc. #79 Gal. only $6.57
Gal. av. 4,000 sq. ft.
NON-flammable, yet dries AT ONCE!

NEWEST for 1960:
100 GAL. WASH CONCENTRATE
Super Concentrated Wetting Agent. Removes dirt, grit. Plastics dry spotless, dropfree, ready for hi-lustre painting. 8# Concentrate makes 100 Gallons wash. Odor-FREE.
8# Conc. $3.69 lb.
2# SAMPLE $4.95 lb.
All costs, both products, FOB CHGO. Lower quantity costs.

NEW #79 CONCENTRATE MERIX Anti-Static
PREVENTS STATIC ON PLASTIC SHEETS OR MOLDED PRODUCTS
ONE APPLICATION REMOVES STATIC CHARGES FOR MONTHS.
EACH GAL. CONCENTRATE #79 MAKES TWO GALLONS DESTATICIZER

JUDGE FOR YOURSELF—ORDER SAMPLE QUANTITIES, DATA SHEETS

TODAY FROM: MERIX TRADE MARK
Dept. MP602
2234 E. 75th St.
CHICAGO 49, ILL.

ALL NEW
MARK II
Shoplifter
New Low Price $195.00*
New Capacity Full 750 lbs.

All lifters at this price *are not* the same. Compare and note the quality of the new Mark II, which now replaces the Type D Shoplifter. Full 750 lb. capacity can be handled safely anywhere on the platform.

No-drift, full control hoist unit. Raise or lower the load to fractional positioning. Built for years of continuous service with minimum maintenance. *Complete* safety features included at no extra cost.

Applicable in small plants for "too heavy to lift loads" and in large plants to supplement powered equipment. The economical way to transfer molds and dies, unload trucks, stack in narrow aisles, or raise parts and machinery to working levels.

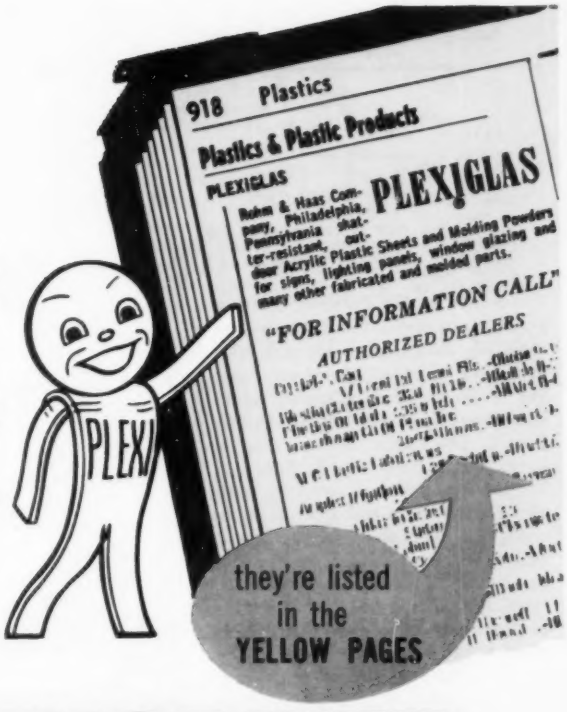
Write for specifications and other details.

ECONOMY ENGINEERING
4513 W. Lake St., Chicago 24, Ill.
*Priced f.o.b. Chicago

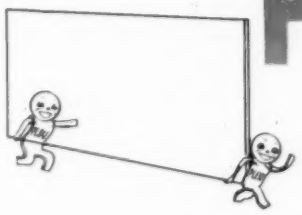
AUTHORIZED
PLEXIGLAS DEALERS
are located in these cities:

Atlanta, Georgia
Baltimore, Maryland
Boston, Massachusetts
Bridgeport, Connecticut
Buffalo, New York
Charlotte, North Carolina
Chicago, Illinois
Cincinnati, Ohio
Cleveland, Ohio
Columbus, Ohio
Dallas, Texas
Dayton, Ohio
Denver, Colorado
Des Moines, Iowa
Detroit, Michigan
Fort Worth, Texas
Grand Prairie, Texas
Hanover, Pennsylvania
Hartford, Connecticut
Houston, Texas
Indianapolis, Indiana
Kansas City, Missouri
Los Angeles, California
Louisville, Kentucky
Memphis, Tennessee
Miami, Florida
Milwaukee, Wisconsin
Minneapolis, Minnesota
New York, New York
Newark, New Jersey
Philadelphia, Pennsylvania
Phoenix, Arizona
Pittsburgh, Pennsylvania
Richmond, Virginia
Rochester, New York
Salt Lake City, Utah
San Antonio, Texas
San Diego, California
San Francisco, California
Seattle, Washington
St. Louis, Missouri
St. Paul, Minnesota
Syracuse, New York
Tampa, Florida
Washington, D. C.
Wilmington, Delaware

Best source of Service on Plastics...



AUTHORIZED PLEXIGLAS DEALERS



It pays to call an Authorized PLEXIGLAS® Dealer when you need plastics. Why? He provides complete service on PLEXIGLAS acrylic plastic, other plastics and a wide range of accessory products. He gives prompt delivery, and is qualified to help you with fabrication and technical information. And your Authorized Dealer has a stock that includes almost any size and thickness of PLEXIGLAS—clear and colored sheets . . . patterned, corrugated and extruded sheets. He is listed under PLEXIGLAS in the Plastics section of telephone directories in major cities.

Chemicals for Industry

ROHM & HAAS COMPANY
WASHINGTON SQUARE, PHILADELPHIA 5, PA.

In Canada: *Rohm & Haas Co. of Canada, Ltd., West Hill, Ontario*

LITERATURE

Write for these publications to the companies listed. Unless otherwise specified, they will be sent gratis to executives who request them on business stationery.

"Amino Resins" *by J. F. Blais.*

Published in 1959 by the Reinhold Publishing Corp., 430 Park Avenue, New York 22, N.Y., 220 pages. Price: $4.95.

Thirteenth in the Reinhold Plastics applications series, this book devotes most of its attention to melamine and urea plastics. However, other resins such as guanamine, alkyl ureas, sulfonamides are also mentioned. The book begins with a general introduction and history of the amino resins, continues with chemistry and manufacturing processes, and then discusses the applications of these resins in molding compounds, adhesives, laminates, textiles, paper treatment, surface coating and other uses. Although written in everyday language the book is thorough in coverage and will be of interest to engineers contemplating the use of amino resins in various products.—*G.R.S.*

Use of Resin Treated Clays in Reinforced Plastics. Physical properties, test results, performance data, advantages, etc., of REA series of resin-treated clays in reinforced plastics. Bulletin TSBT-84. 10 pages. *Georgia Kaolin Co., 21 Parker Rd., Elizabeth 3, N. J.*

Teflon joints and bellows. Specifications, operating pressures, functions, test data, etc., for molded Fluoroflex-T flex joints and bellows for nonstandard low- and high-temperature and corrosive applications. 4 pages. *Resistoflex Corp., Roseland, N. J.*

Color concentrates. "Ferro Paste Color Concentrates for Epoxy Resins" describes mixing procedures, colors available, uses, prices, etc. Includes color samples. 9 pages. *Plastic Color Section, Ferro Corp., 4150 E. 56th St., Cleveland 5, Ohio.*

Fatty acids. Origin, properties, uses, shipping and storage data, etc., for Pamak fatty acids, which are produced from crude tall oil and are used in protective coatings, plasticizers, etc. 22 pages. *Hercules Powder Co., Wilmington 99, Del.*

Equipment guide: "First Facts" is a pocket-size equipment guide for such items as evaporators, dryers, reactors, special tanks, mixers, sifters, screens, extruders, grinders, etc 16 pages. "Handy Reference . . . Engineering Constants, Short Cut Tables, Formulas, and Technical Data Required Frequently in Plant Operations." 8 pages. *First Machinery Corp. Inc., 209-289 Tenth St., Brooklyn 15, N. Y.*

Industrials chemicals. Physical properties, shipping information, etc., for seven classifications of industrial and specialty chemicals—acids and anhydrides, alcohols, plasticizers, aldehydes, aromatic intermediates, solvents, and miscellaneous. Bulletin P-102. 6 pages. *Eastman Chemical Products Inc., Kingsport, Tenn.*

Silicone rubber. Applications, curing agents, vacuum treatment, curing, bonding, properties, suggestions for handling, cure characteristics, and other technical data on a line of room temperature vulcanizing silicone rubber compounds. Can be used for molds for casting epoxies. Bulletin CDS-170A. 12 pages. *General Electric, Silicone Products Department, Waterford, N. Y.*

Flexographic inks. Production features, uses, sample, prices, etc., for Magnagloss flexographic inks. 4 pages. Bulletin 609. *Claremont Pigment Dispersion Corp., 39 Powerhouse Rd., Roslyn Heights, N. Y.*

Impact testers. Specifications, uses, capacity range, etc., for a line of impact testers for standard Izod and Charpy tests on plastics and ceramics. Bulletin 523. 4 pages. *Testing Machines Inc., 72 Jericho Turnpike, Mineola, N. Y.*

Injection molding. Specifications, uses, features, etc., for a line of vertical injection molding machines that are used for insert, contact, and plug molding. 4 pages. *Progressive Tool & Die Co., 530 Boston Turnpike, Shrewsbury, Mass.*

Arc-resistant insulation. Specification sheet gives properties and prices for Glastic Resistrac fibrous glass alumina-polyester, arc-resistant insulation for service in humid and contaminated atmospheres. 2 pages. Companion sheet covers track resistance of Resistrac and five other laminates as tested under the ASTM suggested dust-and-fog tracking resistance test procedure. 1 page. *The Glastic Corp., 4321 Glenridge Rd., Cleveland 21, Ohio.*

Recorders. Specifications, applications, features and accessories, dimensions, operating speeds, etc., for a line of recording instruments for use in the plastics industries. Bulletin GEA-6933. 12 pages. *General Electric Co., Schenectady 5, N. Y.*

Plastics supply catalog. Catalog describes variety of plastics products available, e.g., instrument dust covers; labels; protective garments; bags; bottles; dispensers; stoppers; closures; funnels and flasks; containers; tubes and rods; sheeting; faucets; pumps; stirrers; tanks and trays; medical ware; etc. Catalog 959. 32 pages. *Bel-Art Products, Pequannock, N. J.*

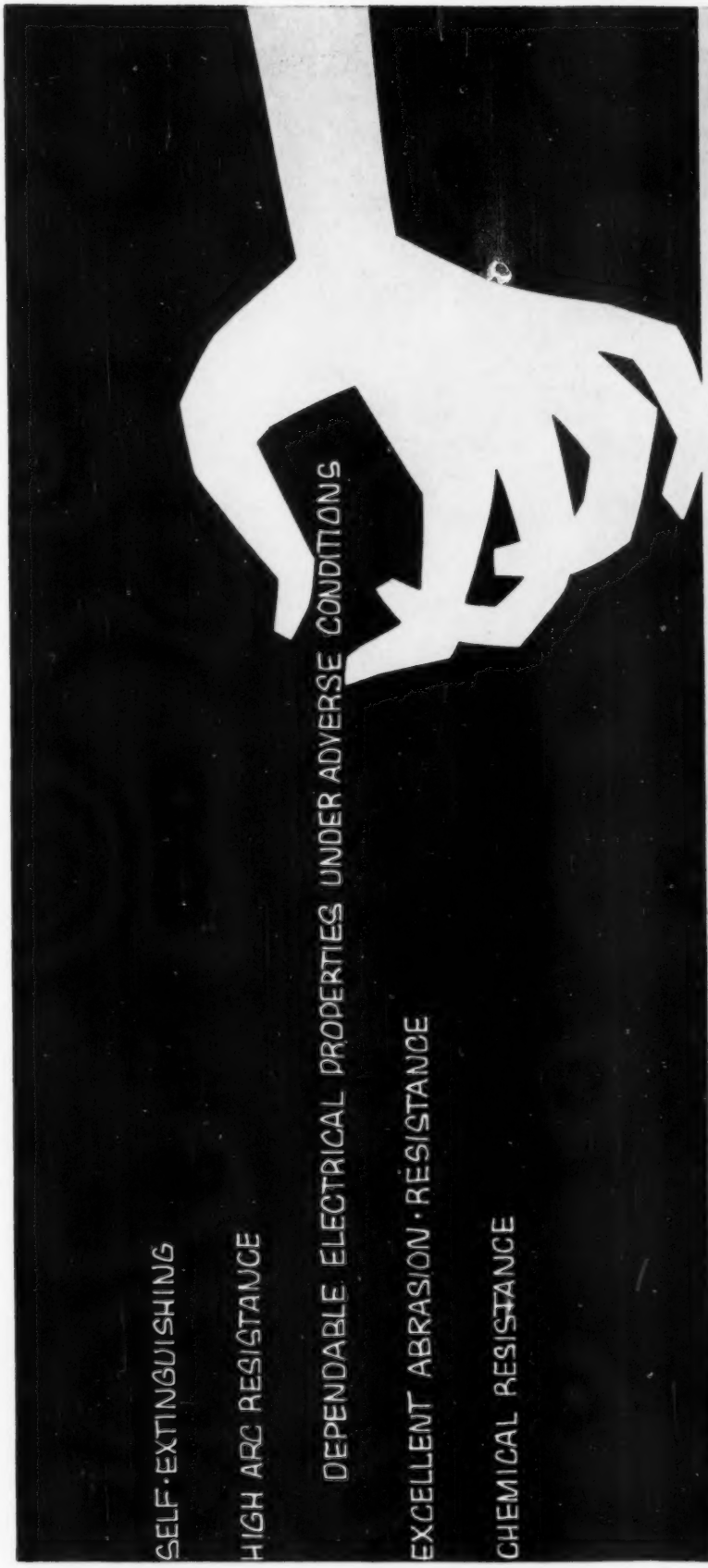
Washers, gaskets, and disks. Price list for a line of washers, gaskets, and disks, including those made of nylon, polyethylene, rigid vinylite, and vulcanized and unvulcanized fibres. 12 pages. *Penn Fibre & Specialty Co. Inc., 2024 E. Westmoreland St., Philadelphia 34, Pa.*

Processing equipment. Sizes, capacities, operating data, etc., for a line of blenders, mixers, and mills. Bulletin GP60. 4 pages. *Troy Div., Skinner Engine Co., Erie, Pa.*

Fire-retardant polyester resin. "Your Fibrous-Glass Boat Retards Fire If It's Built with Hetron Resin" presents questions and answers regarding use of this resin in U. S. Navy craft, industrial work boats, and pleasure craft. Bulletin D2. 4 pages. *Hooker Chemical Corp., P. O. Box 344, Niagara Falls, N. Y.*

Design facilities. "Design and Purchase of Custom Molded Plastics" gives a value analysis approach to the design and purchase of molded components; includes several case histories. 8 pages. *Chicago Molded Products Corp., 1020 N. Kolmar Ave., Chicago 51, Ill.*

Development and Fabrication of High Temperature Reinforced Plastics describes development and fabrication work with high temperature phenolic resins and laminates for missile and aircraft applications. Bulletin 160. **(To page 158)**



CYMEL®
MELAMINE

BEETLE®
UREA

PLASTICS

REMEMBERED FOR PERFORMANCE – CYANAMID MOLDING COMPOUNDS

CYMEL 3135–3136 (glass-filled) Additional distinctive properties: outstanding electrical properties; high impact resistance; extraordinary flame resistance; good dimensional stability. Typical applications: circuit breaker boxes; terminal strips; connectors; coil forms; stand-off insulators. Specifications: Cymel 3135 (MMI-30, MIL-M-14E, Federal L-M-181 Type 8; ASTM D704-55T Type 8); Cymel 3136 (MIL-M-19061, MMI-5).

CYMEL 592 (asbestos-filled) Additional distinctive properties: resistance to atmospheric extremes; high dielectric strength. Typical applications: connector plugs; terminal blocks; a/c, automotive and heavy duty industrial ignition parts. Specifications: MIL-M-14E MME; Federal L-M-181 Type 2; ASTM D704-55T Type 2, SP1 SPEC NO. 27025.

CYMEL 1077 (alpha cellulose-filled) Additional distinctive properties: Surface hardness, heat resistance, unlimited color range. Typical applications: appliance housings, shaver housings, business machine keys. Specifications: MIL-M-14E – Type CMG (in approved colors); Federal L-M-181 Type 1; ASTM D704-55T Type 1, SP1 SPEC NO. 30026.

CYMEL 1500 (wood flour-filled)–CYMEL 1502 (alpha cellulose-filled) Additional distinctive properties: Good insert retention. Typical applications: meter blocks, ignition parts, terminal strips. Specifications: Cymel 1500 (MIL-M-14E Type CMG, Federal L-M-181 Type 6, ASTM D704-55T Type 6); Cymel 1502 (MIL-M-14E Type CMG, Federal L-M-181 Type 7; ASTM D704-55T Type 7.

BEETLE® UREA (alpha-filled) Additional distinctive properties: Economy of fabrication, economy of material, myriad translucent and opaque colors. Typical applications: wiring devices, home circuit breakers, tube bases, appliance housings. Specifications: Federal L-P-406A, LC 726-1, ASTM D705-55, Grade 1 (Arc resistance limits are in process of revision by ASTM), SP1 SPEC NO. 27026.

WRITE FOR COMPLETE TECHNICAL DATA.

CYANAMID

AMERICAN CYANAMID COMPANY • PLASTICS AND RESINS DIVISION • 30 ROCKEFELLER PLAZA–NEW YORK 20, N. Y. OFFICES IN: BOSTON • CHARLOTTE CHICAGO • CINCINNATI • CLEVELAND • DALLAS • DETROIT LOS ANGELES • MINNEAPOLIS • NEW YORK • OAKLAND PHILADELPHIA • ST. LOUIS • SEATTLE • IN CANADA: CYANAMID OF CANADA LTD., MONTREAL AND TORONTO.

A New Twist in Plastics

MOBILE HOME OWNERS NEEDED a better flexible tube for sewer connection, according to a special sales study by the Gemmer Manufacturing Co. of Detroit. Requirements demanded that the tubing be resistant to all types of sewage, weather and household detergents, strong and easily connected. It would have to be made of a rather rigid, inexpensive material with good forming characteristics, capable of being welded as it was formed. To meet these requirements, a new type of tubing material was required.

THE SOLUTION: "PLASTIFLEX," OF SEILON PLASTIC TAPE! Using the unique Kopex process, Gemmer wound SEILON VHI tape around a mandrel with flying reels. The material was then fed into rotating dies that pressed a spiral into the tube, making it completely flexible. And sales are spiraling for the S. H. Leggitt Co., distributors of Plastiflex, offering this unique SEILON plastic product with a full year's guarantee, at an amazingly low price. Other applications of Plastiflex for corrosive fume exhausting are now under research.

SEILON is versatile in its many properties and tailor-made adaptability to your requirements. We welcome the opportunity to help solve your problems—a letter or phone call will start us working.

SEILON

A NAME YOU CAN TRUST IN PLASTICS

PLASTICS DIVISION
SEIBERLING RUBBER COMPANY
Newcomerstown, Ohio • Phone: HYatt 8-8304

12 pages. *CTL, 1240 Glendale-Milford Rd., Cincinnati 15, Ohio.*

Stiffness testers. Illustrates three types of stiffness testers, which are used to evaluate modulus of elasticity of plastics and other materials. 2 pages. *Testing Machines Inc., 72 Jericho Turnpike, Mineola, N. Y.*

Extruders. Specifications, features, etc., for a line of extruders, casting roll units, take-up equipment, and accessories. 4 pages. *Modern Plastic Machinery Corp., 64 Lakeview Ave., Clifton, N. J.*

Insulated thermocouples. Specifications, features, etc., for a line of mineral insulated thermocouples. Catalog 300. 20 pages. *Conax Corp., 2300 Walden Ave., Buffalo 25, N. Y.*

Indicating pyrometer controller. Specifications, measuring and control system data, process application, accessory equipment, etc., for the new Type Z5 indicating pyrometer controller. Bulletin 0035. 4 pages. *Atlantic Pyrometers Inc., 190 Warburton Ave., Hawthorne, N. J.*

Conveyor system. Dimensions, features, etc., for the Hi-Lift Cable-Veyor elevators, which are used for vertical elevation of wet or dry flowable bulk materials. Bulletin H-556-A. 4 pages. *Conveyor Div., Hapman Corp., 630 Gibson St., Kalamazoo 6, Mich.*

Process timer. Features, applications, ratings, dimensions, prices, etc., for Type TSA-14 process timer that is used for controlling repeating cycles. 4 pages. *General Electric Co., Schenectady 5, N. Y.*

Plastics tooling resins. "Maraset Tooling Resins" is a compact guide to plastics tooling materials for the plastics-forming and metal-forming industries; includes epoxy laminating and surface coating resins, epoxy casting resins, high-temperature epoxy resins, epoxy adhesives, and sealing compounds. 2 pages. *Marblette Corp., 37-31 Thirtieth St., Long Island City 1, N. Y.*

Plastic steel. "Devcon Products for Tooling" describes how several manufacturers use Plastic Steel and other Devcon products for making tools, jigs, fixtures, metal forming dies, molds, masters, and other items. Bulletin 2. 8 pages. *Devcon Corp., Danvers, Mass.*

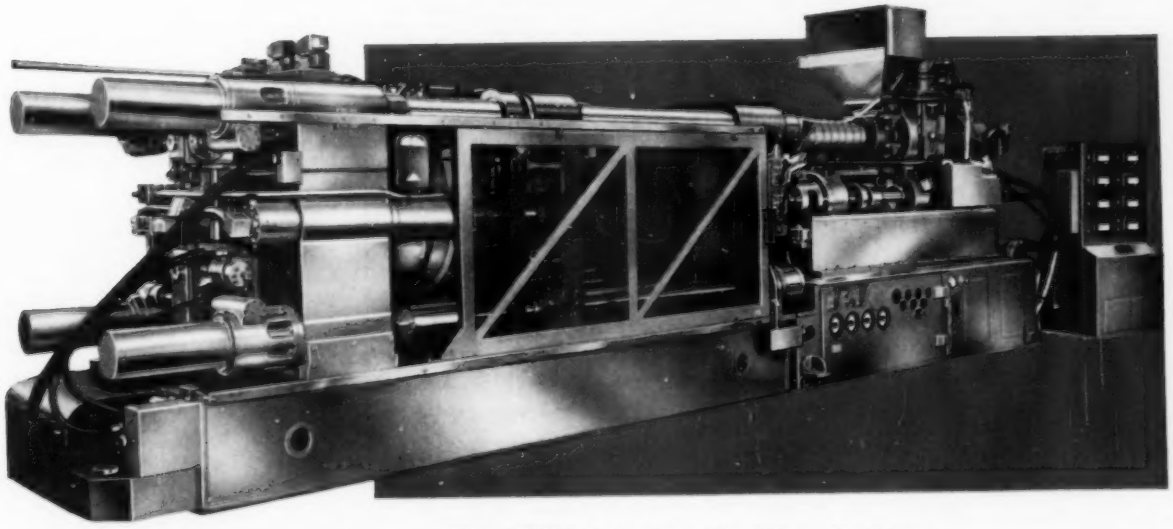
Release and separating papers. Types, coatings required, etc., for a line of release **(To page 160)**

THE BASIS OF *Leadership...*

The Gyroscope must be in constant motion in order to remain in position . . .

WINDSOR

who, in the past have contributed significantly to advancements in thermoplastic moulding techniques, maintain THEIR position by the constant application of the highest engineering skills and craftsmanship, and directed imagination.

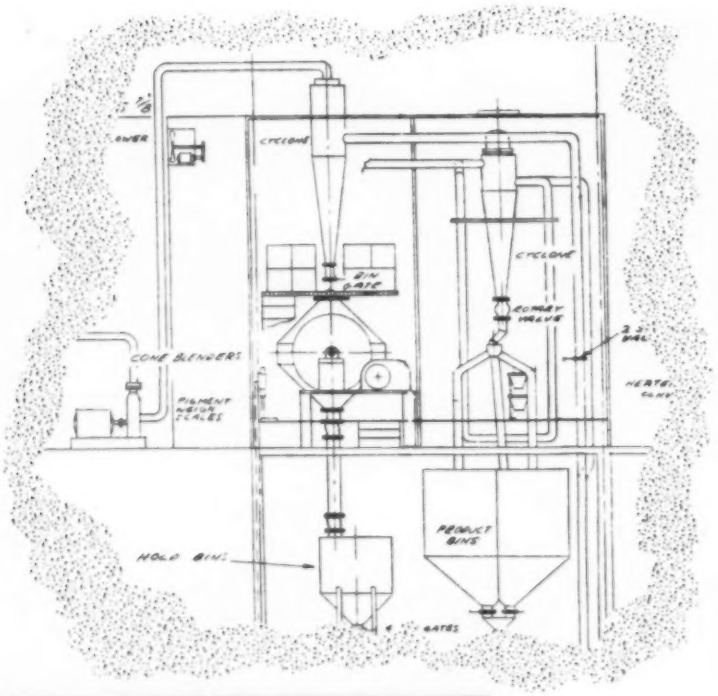


* *The Windsor range includes: Injection Moulding Machines in capacities from 1 to 210 oz. and Extrusion Machines with outputs up to 450 lb. per hour.*

The AP200 Injection Moulding Machine
Designed for hand or automatic cycle control. Fitted with 2-stage injection unit incorporating the famous twin-screw "Autoplas" preplasticiser. Capacity up to 350 lb. per hour. Moulds 124 oz. of polystyrene in one shot.

R.H. Windsor LTD

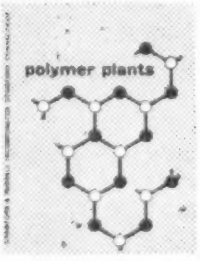
Sales and Service:
R. H. WINDSOR OF CANADA LTD., 56 Advance Road, Toronto 18, Ontario, Canada
Tel.: BElmont 2-2971. Grams and Cables: Winplas, Toronto, Canada.
Head Office and Works: Leatherhead Rd., Chessington, Surrey, England.
London Office: 76 Jermyn Street, St. James's, S.W.1., England.



POLYMER
PLANT
ENGINEERING

Crawford & Russell has the largest technical staff specializing exclusively in designing and building complex polymer plants. We are now designing three multi-million dollar polymer plants, each the first of its kind, and many smaller units. We build pilot plants and special equipment. Our designs are original and advanced—our services are completely confidential.

Write for Bulletin 910



complete plants: RESINS • PLASTICS • SYNTHETIC RUBBERS

MONOMER ⟶ POLYMER ⟶ FINISHED PRODUCT
POWDER
PELLET
FILM
EXTRUSION
SOLUTION
EMULSION

CRAWFORD & RUSSELL
INCORPORATED
696 SUMMER ST., STAMFORD, CONNECTICUT

and separating papers, which are used with polyvinyl ether masses; for film castings, container liners, interleaving caulking compounds, etc. 4 pages. *Riegel Paper Corp., 260 Madison Ave., New York 16, N. Y.*

Fibrous glass skylights. Sizes, specifications, design data, etc., for a line of Marcolite fibrous glass and aluminum panels. 4 pages. *The Marco Co., 45 Greenwood Ave., East Orange, N. J.*

Resin guide. Properties, major uses, etc., for a line of resin-rubber compounds, polyesters, and PVC resins. 8 pages. *Naugatuck Chemical, Naugatuck, Conn.*

Sprayup system. Advantages, versatility, uses, etc., for using the Rex Rand sprayup system in making reinforced plastic shapes. 6 pages. *The Rex Metal Parts Co., 1295 W. 78th St., Cleveland 2, Ohio.*

RP building panels. Specifications, uses, and design data for a line of Sanpan reinforced plastics, translucent building panels. (For additional reference, see "These fabulous panels," MPI, Sept. 1959, p. 88.) 8 pages. *Panel Structures Inc., 45 Greenwood Ave., E. Orange, N. J.*

New Products of Reinforced Plastic Offered for Proprietary Manufacture. Specifications, drawings, etc., of some new RP applications developed at the Royal College of Art, London, England. 28 pages. *Monsanto Chemical Co., 800 N. Lindbergh Blvd., St. Louis 66, Mo.*

Polyester Handbook. General characteristics, chemistry, general formulations, reinforcing bases, general methods of fabrication, design considerations, and other technical data dealing with a line of unsaturated polyesters. 130 pages. *Scott Bader & Co., Ltd., Wollaston, Wellingborough, Northamptonshire, England.*

PVC pipe. Physical, thermal, electrical, and miscellaneous properties; fittings available; maximum operating pressures and other technical data for Kraloy polyvinyl chloride pipe. 38 pages. *Kraloy Plastic Pipe Co. Inc., P. O. Box 22048, Los Angeles 22, Calif.*

Etching solution. Procedure, contact time, safety precautions, etc., for the use of Acton Fluoroetch solution, an etching solution for making fluorocarbon polymers bondable to other materials. 3 pages. *Acton Laboratories, 1180 Raymond Blvd., Newark 2, N. J.*—**End**

AVISUN

The full distribution facilities of the Schulman organization are now ready to supply you with AVISUN POLYPROPYLENE molding and extrusion resins. Strategically located Warehouses assure quick delivery to any point in the nation. In addition, through A. Schulman Inc., AviSun technologists are at your call to assist you in exploring present or anticipated product applications for this exciting new material.

A. Schulman Inc.

AKRON 9, OHIO
790 E. Tallmadge Ave.

EAST ST. LOUIS, ILL.
14th and Converse Sts.

LOS ANGELES 17, CAL.
3350 Wilshire Blvd.

BOSTON 16, MASS.
738 Statler Building

NEW YORK 22, N. Y.
460 Park Avenue

ORANGE, TEXAS
P. O. Box 1209

CHICAGO 45, ILL.
2947-51 W. Touhy Ave.

Stan Ekman
Newest Member of the
SPENCER
Family of Plastics
POLY-PRO

More Facts About SPENCER

POLY-PRO™

Polypropylene

Coming your way in commercial quantities is "Poly-Pro" Polypropylene—the newest member of Spencer's family of thermoplastics. "Poly-Pro" offers a combination of: performance at elevated temperatures, reproduction of mold detail, rigidity, resistance to cold flow, unique flex life, abrasion resistance, dielectric properties, chemical and moisture resistance. These properties create a plastic which challenges the imagination of the design engineer. For complete information, contact your Spencer Representative.

LOOK AT THIS WIDE RANGE OF USES FOR SPENCER POLYPROPYLENE:

MOLDED ITEMS

Strong, hard-working parts resistant to heat and wear.

FILM and SHEETING

Clear, sparkling film with excellent protective qualities.

WIRE and CABLE COVERING

Tough, flexible coatings with superior electrical properties and abrasion resistance.

TUBING, PIPE and PROFILES

Dimensionally stable tubing capable of handling hot, corrosive liquids.

COATINGS and LAMINATES

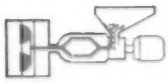
Glossy coatings impermeable to oils, greases and moisture.

FIBERS and MONOFILAMENTS

Tough, abrasion resistant filaments with high strength, wet or dry.

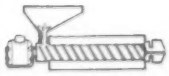
LOOK AT THE WAYS YOU CAN PROCESS SPENCER POLYPROPYLENE

INJECTION MOLDING



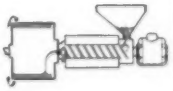
The mass production processing technique. Even intricate parts can be made with speed and economy.

EXTRUSION



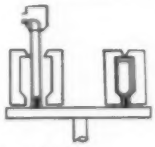
Constant cross sections of indefinite length. Films, sheeting, profiles, laminates and coverings are made in this manner.

CENTRIFUGAL CASTING



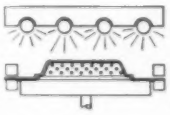
Forms massive cylindrical parts of infinite variety. Economical particularly for small quantity orders.

BLOW MOLDING



Provides hollow, thin-wall items of virtually any closed shape. Bottles, toys and novelties are common.

VACUUM FORMING



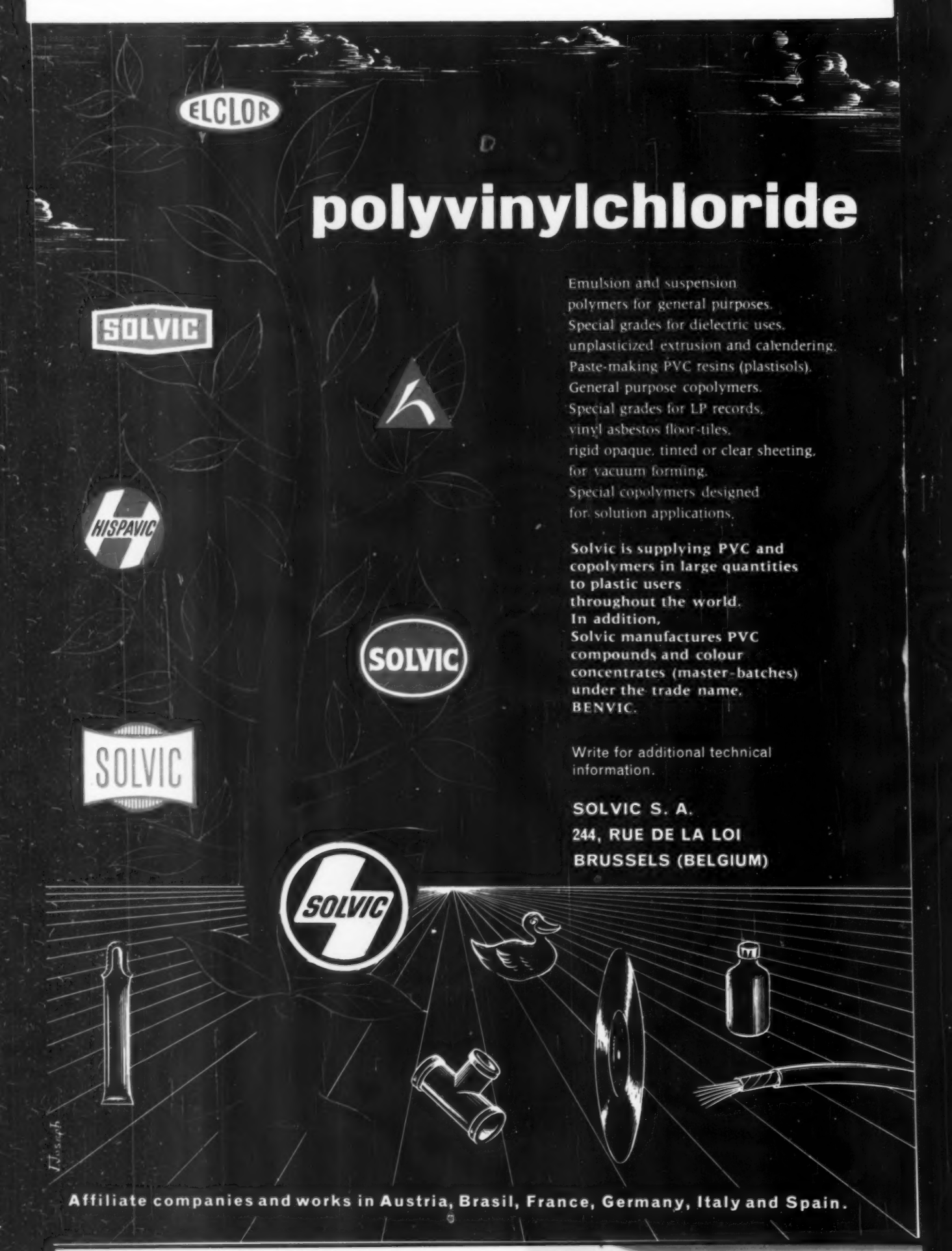
Yields thin-wall products of irregular, relatively flat shapes. Low production volumes most practical.

FABRICATION

Heat sealing, welding, positive joining used to form shapes and films into complex products.

SPENCER® POLY-PRO™ POLYPROPYLENE

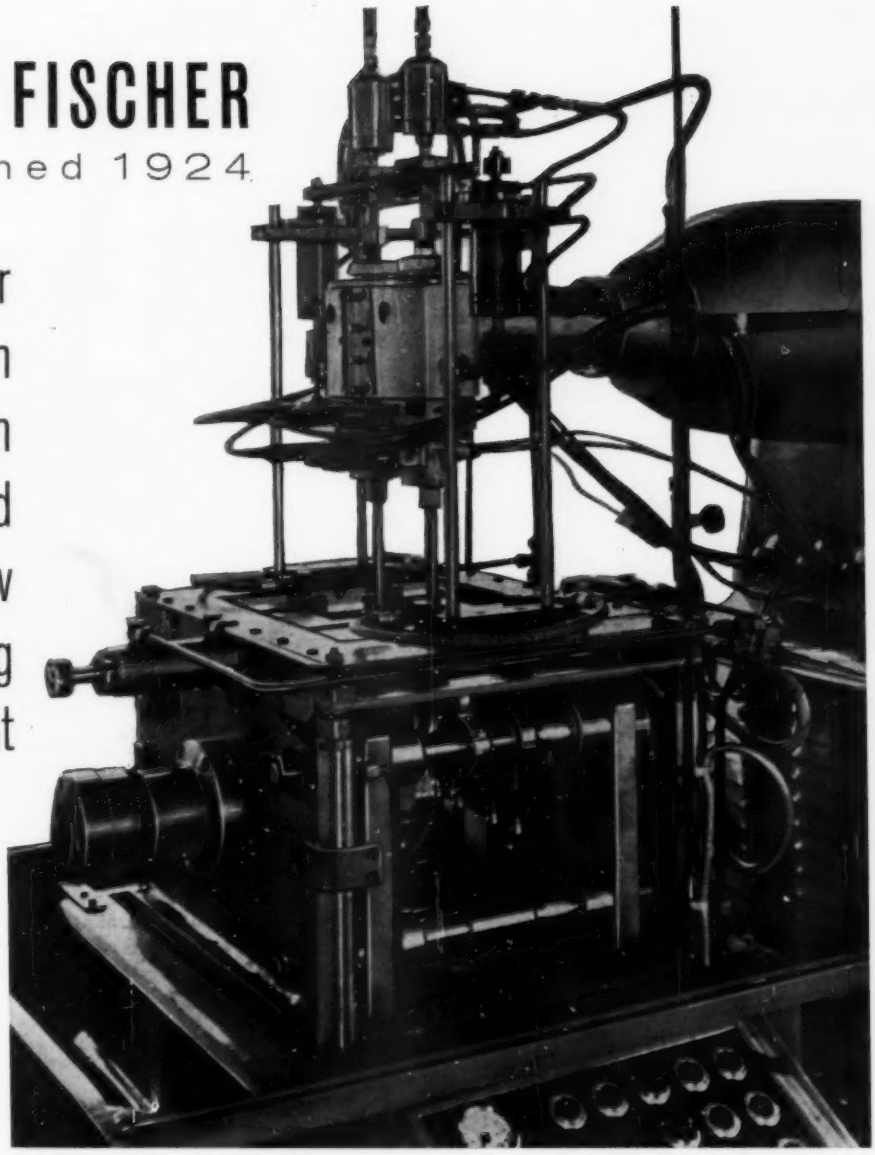
SPENCER CHEMICAL COMPANY, DWIGHT BUILDING, KANSAS CITY 5, MO.


ELCLOR
polyvinylchloride
SOLVIC
HISPAVIC
SOLVIC
SOLVIC
SOLVIC
Emulsion and suspension
polymers for general purposes.
Special grades for dielectric uses.
unplasticized extrusion and calendering.
Paste-making PVC resins (plastisols).
General purpose copolymers.
Special grades for LP records.
vinyl asbestos floor-tiles.
rigid opaque, tinted or clear sheeting.
for vacuum forming.
Special copolymers designed
for solution applications.
Solvic is supplying PVC and
copolymers in large quantities
to plastic users
throughout the world.
In addition,
Solvic manufactures PVC
compounds and colour
concentrates (master-batches)
under the trade name.
BENVIC.
Write for additional technical
information.
SOLVIC S. A.
244, RUE DE LA LOI
BRUSSELS (BELGIUM)
Affiliate companies and works in Austria, Brasil, France, Germany, Italy and Spain.

JOHANN FISCHER

established 1924

leader
in
extrusion
and
blow
molding
equipment



The FISCHER Blow Molding Machine

Model BM500-S...

Completely automatic double head, continuous extrusion, capacity up to 32 ounces.

Other models available in capacities up to 60 gallons.

Representative for sales and service:

BARCLAY INDUSTRIES, INC.

420 Lexington Avenue, New York 17, New York • LExington 2-0717

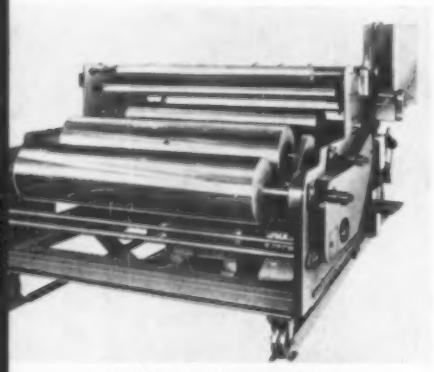
MASCHINENFABRIK JOHANN FISCHER

Lohmar Bez, Köln 1, West. Germany

Machinery-equipment

(From pp. 48-52)

in. and has a mirror-like finish of 2 microinch or better. A 1½-hp. motor with electronic speed control drives the rolls. Provisions can be made for electronic surface treatment of the film. To avoid undesired embossing on thin films, pinch rolls



MPM Model WSF-54 casting roll unit is available with roll diameters of 12 in. and up.

have been eliminated. The unit automatically compensates for line speed and is fully instrumented with tachometers to show line, windup, and empty core speeds. The turret type winder has individual 1½-hp. electronically controlled drives for each shaft for constant tension control during roll built-up. Other features include potentiometer control for instant tension variation, and automatic cut-off and winding splice. *Modern Plastic Machinery Corp., 64 Lakeview Ave., Clifton, N. J.*

Wire spooler

Single-reel take-up for wire coating lines, Model SR 36, is designed for wire speeds up to and exceeding 2000 ft./min. It handles reels with diameters from 12 to 36 in. and up to 24 in. wide. Full reels weighing up to 2000 lb. can be accommodated. The unit has pneumatic reel arms, adjustable Dog Pin and infinitely adjustable traverse lay and movement. The ball-bearing-mounted wire guide rolls accept wires from 0 gage to ¾ inches. All rotating parts are mounted in sealed double-row ball bearings. The machine is available with a variety of drives. *Davis-Standard, Div. of Franklin Research Corp., Mystic, Conn.*

Infra-red gas heater

Operated on bottled propane gas, portable heaters produce infra-red rays by burning the gas on the surface of a ⅜-in. thick perforated ceramic mat containing 200 holes per sq. in. The heaters can be used for spot heating in industrial plants and for curing, drying, or softening plastics in outdoor *in situ* processing. Three sizes are offered. The smallest unit, weighing 8 lb., operates for 26 hr. on a 20-lb. liquid propane cylinder. Two larger sizes are mounted on adjustable height vertical support rods attached to wheeled propane bottle carriers. The largest unit operates for 60 hr. on 100 lb. of propane and the medium-sized unit for 90 hours. Operating costs range from approximately 5¢ to 15¢/hr., depending, of course, on the size unit selected. *Perfection Industries, Div. of Hupp Corp., 1135 Ivanhoe Rd., Cleveland 10, Ohio.*

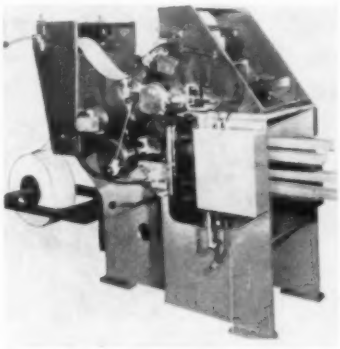
Loader-dryer

Model No. 24 automatic jet loader and dryer combination has been designed for self-contained operation. It will dry, preheat, and load all types of plastic granular materials at rates between 120 and 240 lb./hr., depending on the materials and drying conditions required. It requires no auxiliary compressed air supply, using a blower system and the drying air to convey the material to the machine hopper. Feed bin capacity is 9 cu. feet. Construction is airtight, dustproof, and includes a built-in air filter using easily replaced, inexpensive filter media. The unit requires a minimum of 32 by 35 in. of operable floor space and it can be mounted next to the injection machine or extruder if desired. *Thoreson McCosh Inc., 18208 West McNichols Road, Detroit 19, Mich.*

THORESON McCOSH hopper-dryer-loader combination requires no auxiliary compressed air supply.

Blanking press

Developed for blanking thin plastic sheet, press comes equipped with a continuous roll feed and automatic scrap cutter, and will blank unprinted or printed plastic film at rates of 100 to 150 strokes/min. Maximum width of material is 17 in.; thickness of material for standard



EMHART blanking press continuously makes plastic pre-forms from roll feed.

unit is up to and including 1/16 inch. Heavier gages require special handling. Finished blanks are automatically stacked in chutes by the machine for rapid transfer to the magazines of forming machines. *Portland (Conn.) Division of The Emhart Manufacturing Co., Main Street, Portland, Conn.*

Portable mixer

Suitable for use in mixing polyesters, epoxies, and other viscous, resinous liquids, the Model PM 756 mixer will accommodate batches of 5 to 300 gallons. The unit can be centered in a 48-in. diam. tank whose bottom clears the floor by 5 inches. For smaller batches, such as 55-gal. drums, the legs of the unit will straddle the container. The mixer is equipped with spark- and solvent-proof plastic wheels and casters, a snap action floor lock converts the mixer into a fixed unit. The blades can be adjusted from 6 to 54 in. above the floor by means of a foot-pedal-operated hydraulic system. Mixers are available in variable speed (800 to 3600 r.p.m.) and single speed (1800 r.p.m.) models in 5, 7½ and 10 hp.; with or without explosionproof motors. *Specialty Machinery Corp., 50 Roanoke Ave., Newark 5, N. J.*—**End**

IC* POLYESTERS

step UP output

WITH EXISTING EQUIPMENT

You can obtain more production from existing equipment when you use IC Hi-speed Polyesters and Gel Coats. Fast curing, fast wetting, and fast strength development help you expand unit output, while maintaining uniformly high quality.

From a single source—Interchemical—you can get IC Hi-speed Polyesters, Gel Coats, Color Concentrates, Mold Release Coatings, Sanding Agents and other accessory products for every need. This complete package is backed by the finest technical service in the industry.

See how faster, more trouble-free production can be yours. Write on your company letterhead for details on IC Hi-speed Thixo Polyester Resins and IC Hi-hiding white and colored gel coats.

Interchemical
CORPORATION
Finishes Division

Commercial Resins Department—1754 Dana Ave., Cincinnati 7, Ohio. Headquarters Office: 224 McWhorter St., Newark 5, N.J. Factories: Chicago, Ill. • Elizabeth, N.J. • Cincinnati, Ohio • Los Angeles, Cal. • Newark, N.J. • Mexico City, Mex. In Canada, these polyester resins are made by Chemical Oil & Resin Company, Toronto, Ontario and sold under its trademarks. *IC is a trademark of Interchemical Corporation.*

Photo Courtesy Crestliner Inc., Little Falls, Minn.

When the problem is inorganic pigments and extenders for compounding plastics...

WILLIAMS invites you to take advantage of its 80 YEARS EXPERIENCE

Today Williams offers a complete line of inorganic pigments and extenders for the plastics industry. All have color permanence and chemical stability. Here is a representative list of these products.

Pure Red Iron Oxides • Pure Yellow Iron Oxides • Pure Black Iron Oxides • Pure Brown Iron Oxides • Pure Chromium Oxide Greens Pure Hydrated Chromium Oxides • Umbers • Siennas • Lampblack Anhydrous Calcium Sulfate • Barytes • Calcium Carbonates

Send today for detailed Technical Reports which give you complete description of the chemical and physical properties of each product listed above. Address Department 75, C. K. Williams & Co., 640 N. 13th Street, Easton, Pennsylvania.

WILLIAMS
COLORS & PIGMENTS

C. K. WILLIAMS & CO. • E. ST. LOUIS, ILL. • EASTON, PA. • EMERYVILLE, CAL.

Your fast way of pre-determining the weathering qualities of a Plastic is in the ATLAS WEATHER-OMETER®

Test for resistance to sunlight, moisture, and thermal shock.
Results are accurate and reliable and can be reproduced precisely over and over again. The Weather-Ometer furnishes a yard stick to measure the improved quality of a plastic in development and to maintain a standard of quality in production.
Automatic control of light, moisture, and temperature, can be set for repeating cycles according to the test program selected. A year of destructive weathering can be reduced to a few weeks of testing in the Weather-Ometer.

For Color Fastness only — use the Atlas Fade-Ometer®. Fully automatic in operation

Write for technical information and recommendations for your particular problem.

ATLAS ELECTRIC DEVICES CO., 4114 N. Ravenswood Ave., Chicago 13, Illinois

WEATHER-OMETERS • FADE-OMETERS • LAUNDER-OMETERS

Plastics Digest

(From pp. 54, 56)

oxygen. A typical polymer is the bifunctional methylolphenol resin with alkyl or hydrocarbyl groups in the para position. Tin(II) chloride dihydrate was the preferred catalyst for the vulcanization.

Polymerization of triallyl cyanurate-polyester resins. D. E. German, B. H. Clampitt, and J. R. Galli. J. Polymer Sci. *38*, 433-40 (Aug. 1959). Differential thermal analysis data and infra-red spectra are utilized to establish the mechanism by which a particular triallyl cyanurate-polyester (Vibrin 135) resin polymerizes. Approximately one-fourth of the polyester double bonds are of the fumarate type and only these are capable of homopolymerization. In Vibrin 135, however, all of the polyester double bonds polymerize, along with two of the triallyl cyanurate double bonds, giving rise to one exothermic peak. From the nature of this polymerization it is inferred that a substantial amount of copolymerization occurs. Polymerization of the final triallyl cyanurate double bond, along with isomerization to the polymerized triallyl isocyanurate form, gives rise to a second exothermic peak.

Publishers' addresses

Adhesives Age: Palmerton Publishing Co. Inc., 101 W. 31st St., New York 1, N. Y.
A.S.T.M. Bulletins: American Society for Testing Materials, 1916 Race St., Philadelphia, Pa.
British Plastics: Iliffe & Sons Ltd., Dorset House, Stamford St., London SE1, England.
Bulletin Chemical Society of Japan: No. 5, 1-chome, Surugadai Kanda Chiyoda-Ku, Tokyo, Japan.
Chemical and Engineering News: American Chemical Society, 1155 Sixteenth St., N. W., Washington 6, D. C.
Chemical Week: McGraw-Hill Publishing Co. Inc., 330 W. 42nd St., New York 36, N. Y.
Corrosion Technology: Stratford House, 9 Eden St., London NW1, England.
Industrial and Engineering Chemistry: American Chemical Society, 1155 Sixteenth St., N. W., Washington 6, D. C.
Journal of American Oil Chemists' Society: American Oil Chemists' Society, 35 E. Wacker Dr., Chicago 1, Ill.
Journal of Applied Polymer Science: Interscience Publishers Inc., 250 Fifth Ave., New York 1, N. Y.
Journal of Polymer Science: Interscience Publishers Inc., 250 Fifth Ave., New York 1, N. Y.
Kunststoffe: Karl Hanser Verlag, Leonard-Eck Strasse 7, Munich 27, Germany.
Kunststoff-Rundschau: Brunke Garrels, Verlagsbuchhandlung, Borgfelderstr. 83, Hamburg, Germany.
Materials in Design Engineering: Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y.
Paint and Varnish Production: Powell Magazines Inc., 855 Avenue of the Americas, New York 1, N. Y.
Plastics Institute Transactions & Journal: The Plastics Institute, 6 Mandeville Pl., London W1, England.
Plastics Technology: Bill Brothers Publishing Corp., 630 Third Ave., New York 17, N. Y.
Plastics World: Cleworth Publishing Co., Inc., 342 Madison Ave., New York 17, N. Y.
SPE Journal: Society of Plastics Engineers Inc., 65 Prospect St., Stamford, Conn.—**End**

DABCO®

Use this superior catalyst for unmatched stability, economy, and one-shot convenience in the full range of rigid, semi-rigid and flexible urethane foams.

Use DABCO with any urethane grade polyol for:

Rigid Foams—DABCO assures complete catalysis of the highly functional polyols used in rigid formulations. This results in low K factors, good retention of chlorofluorohydrocarbon and dimensional stability.

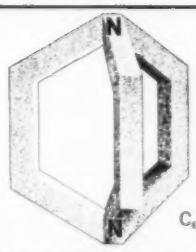
Flexible Foams—Manufacturers of flexible foams depend on DABCO to assure continuous production of uniform, fast curing, stable, and odorless foams.

Economy—DABCO's high activity and unique performance results in economy with no sacrifice of optimum foam properties. From High Point to The Hague users agree DABCO is the economical key to better foams.

Elastomers and Coatings—DABCO makes possible fast room temperature cures and improves overall physical properties.

**Houdry means progress . . . through Catalysis*

Write for technical data and commercial price schedule on DABCO.



*HOUDRY
PROCESS CORPORATION
1528 Walnut Street, Philadelphia 2, Pa.

Reinforced plastics

(From pp. 83-88)

reinforced plastics premixes and molding materials. There is a wide spread in estimates of the volume of molding materials, since much compounding is done by processors themselves. These guesstimates run from 35 to 60 million lb. for 1959. Be the total what it may, it is the opinion of companies active in the field that the automotive industry's share is in the neighborhood of 50 to 60%, the electrical industry's, 20 to 30%, with the remaining 20% accounted for by missile and aircraft, appliances, as well as miscellaneous uses.

Business in reinforced plastics products made by filament winding presently runs $15 to $20 million a year. Today this is divided among about 23 companies. More may enter the field next year.

Applications outlook

Aircraft and missiles: Partly because of security, partly because of use as unseen or unidentified components of a missile or aircraft, the public and much of general industry are ignorant of the high strengths and exacting performances turned in by reinforced plastics in these fields.

In aircraft, uses range from food trays to quasi-structural, out-of-sight, applications such as the long, hat-shaped channels on the Boeing 707 which both divide and insulate the plane's inner and outer frame (see "Ingenious insulation for jets," MPl, Sept. 1959, p. 102). A sampling of other reinforced plastics aircraft uses include helicopter contravanes and stabilizers as well as body parts, fin tip assemblies, splitter ducts, electronic gear housings, air scoops, instrument control panels, and airplane landing mats, as well as skis.

Lockheed has just announced use of these materials as the frame of executive-type chairs on its Jet Star (see p. 87 for details). Considering the growing acceptance of reinforced plastics in institutional, school, business and transportation seating, this extension into aircraft is a development worth watching.

There is one aircraft use of reinforced plastics that the public got to know during 1959—and jet passengers to bless. It's the baggage expediter container. It was introduced by American Airlines on their 707 Jet Flagships and, to date, the Molded Fiber Glass Body Co. has delivered parts for 450 containers to Boeing for assembly (see photo on p. 88).

The six containers carried by a 707 jet—each holding over 35 bags or up to 1400 lb. of luggage and cargo for a maximum total load of 8400 lb.—are out of the plane and on their way to the baggage claim area in 7 minutes. Confirmation of the time saving lies in the fact that American has extended the use of RP containers to their DC-8's and Electra's and will use them on other jets during the next two years. United Airlines has adopted these containers, too. Development and test work suggests that they'll become standard on all jets. There is no information available on how

BALLS UNLIMITED
FOR UNLIMITED APPLICATIONS
IN FIELDS UNLIMITED

ACRYLICS, CELLULOSICS, POLYSTYRENE, POLYETHYLENE, NYLONS, TEFLON®, LEXAN®, WOOD, STYROFOAM®.

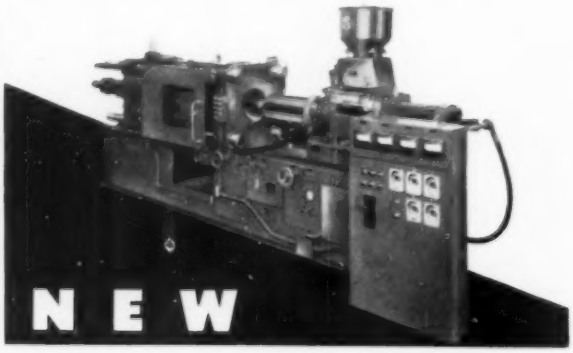
NON METALLIC BALLS are used for a great variety of things such as check valves, ball bearings, rollers, detents, etc., as well as many uses in the chemical field. If you have a need, we are equipped to make balls from 1/16" dia. up to 1" dia. in quantity. Samples of many sizes in a range of materials are available.

We can also supply small turnings of cylindrical shapes formed from round rods and tubes for all types of applications. Range of sizes is from ⅛" to 1" diameter and up to 7" long. We hold tolerances of .002 on plastic and .005 on wood, plus or minus.

We make balls for all Roll-on Applicators. If a non-metallic ball is the answer to your problem, we are at your service.

If a plastic ball will make it better . . . ORANGE can make it best!

PLASTIC BALL DIVISION
ORANGE PRODUCTS, INC.
554 MITCHELL ST., ORANGE, NEW JERSEY



NEW
18/24 oz. MOLDING MACHINE
by LOMBARD
- Big, rugged and fast
- 50" daylight opening
- Plunger speeds over 400 in./min.
- Large platens

PLUS "modern-as-tomorrow" features throughout

WRITE FOR CATALOG
INJECTION MOLDING MACHINE DIVISION
LOMBARD GOVERNOR CORP.
Ashland, Massachusetts

Can you visualize your product in Plastic?

- Prototype to medium runs
- Low cost, heat treated, semi-permanent, tool steel molds
- Estimated tool life: 100,000 pieces per cavity
- Thermoplastic and Thermosetting
- Any plastic
- Any color
- Insert work a specialty

SEND SKETCH, BLUEPRINT OR PART, PLUS QUANTITY, FOR PROMPT QUOTATION

DAYTON ROGERS *Manufacturing Company*

MINNEAPOLIS 7K, MINNESOTA

SOLVE YOUR PACKING PROBLEMS at Low Cost with

PARTITIONS

· Sleeves · Necks · FOR PROTECTIVE PACKAGING

WRITE, PHONE, WIRE for QUOTATIONS on YOUR REQUIREMENTS

Peter Partition Corp. operates one of America's *largest plants devoted exclusively to the production of cardboard partitions.*

PETER PARTITION CORP.

Manufacturers of Cardboard Partitions

124 BOERUM PLACE BROOKLYN 1, N.Y.

Telephone: TRiangle 5-4033

Now - a roll covering that solves many problems in the processing of Plastic, Film, and Foil . . .

SEALSKIN®

Roll Covering

provides outstanding resistance to high temperature operation — and "cools off" without complications. SEALSKIN rolls are providing long service in the handling of supported or unsupported film over .008" thick.

Bulletin S-1 describes SEALSKIN, gives its advantages and limitations. Ask for your copy.

Other S-W developments in roll covering . . .

ROLEASE® — an outstanding cover for poly coating and laminating. Good release, no sticking. Takes temperatures up to 400°F.

PLASTILOY® — used in many high temperature fusing and laminating applications.

For the newest developments in roll-covering progress, it will pay you to talk with the man from:

STOWE-WOODWARD, INC.

Newton Upper Falls, Mass.
Neenah, Wisconsin • Griffin, Georgia
on the West Coast
HUNTINGTON RUBBER MILLS, INC.
Seattle, Washington • Portland, Oregon
Port Coquitlam, British Columbia, Canada

RC was there...

RC cooks never run out of tested recipes for top performance. Through sound research and solid experience, RC Plasticizers and Insular Resins provide your wire and cable with three vital electrical prerequisites: high insulation resistance, ease of processing and maximum durability. RC Plasticizers and Insular Polymers and Copolymers can be successfully applied to an impressive range of applications. We solicit your inquiries for advice, technical bulletins and samples. Remember, your product performance will prove . . . RC was there!

Now available: New booklets on "RC Plasticizers and Comonomers," "Insular Polymers and Copolymers."

READY . . . RELIABLE . . . RC SERVING AMERICAN INDUSTRY SINCE 1930

RUBBER CORPORATION OF AMERICA

New South Road, Hicksville 1, N. Y. Sales Offices: New York · Akron · Chicago · Boston

much of the 37 million lb. of reinforced plastics used by aircraft and missiles in 1959 went into new applications and how much into established uses in a greater number of planes and missiles. But it can be expected that an ever larger proportion of the 40% greater volume that is predicted for this field by 1965 will be accounted for by even greater use per unit.

Boats: In 1959, from 120,000 to 130,000 of the 329,000 outboard pleasure boats sold were reinforced plastics, making this market far and away the largest user of these materials. Reinforced plastics are expected to "take over" in this field within the next three years. Even now not more than six major boat producers continue to hold out against any use of reinforced plastics.

The next developments in boats are expected to come from greater invasion of the inboard market and from increased acceptance in larger boats. Only recently, reinforced plastic 40-footers were unique. This year, Hatteras Yacht Co. is turning out 40-ft. motor yachts on a production-line basis; and the U. S. Navy now accepts RP hulls for Navy boats up to 50 ft. in length.

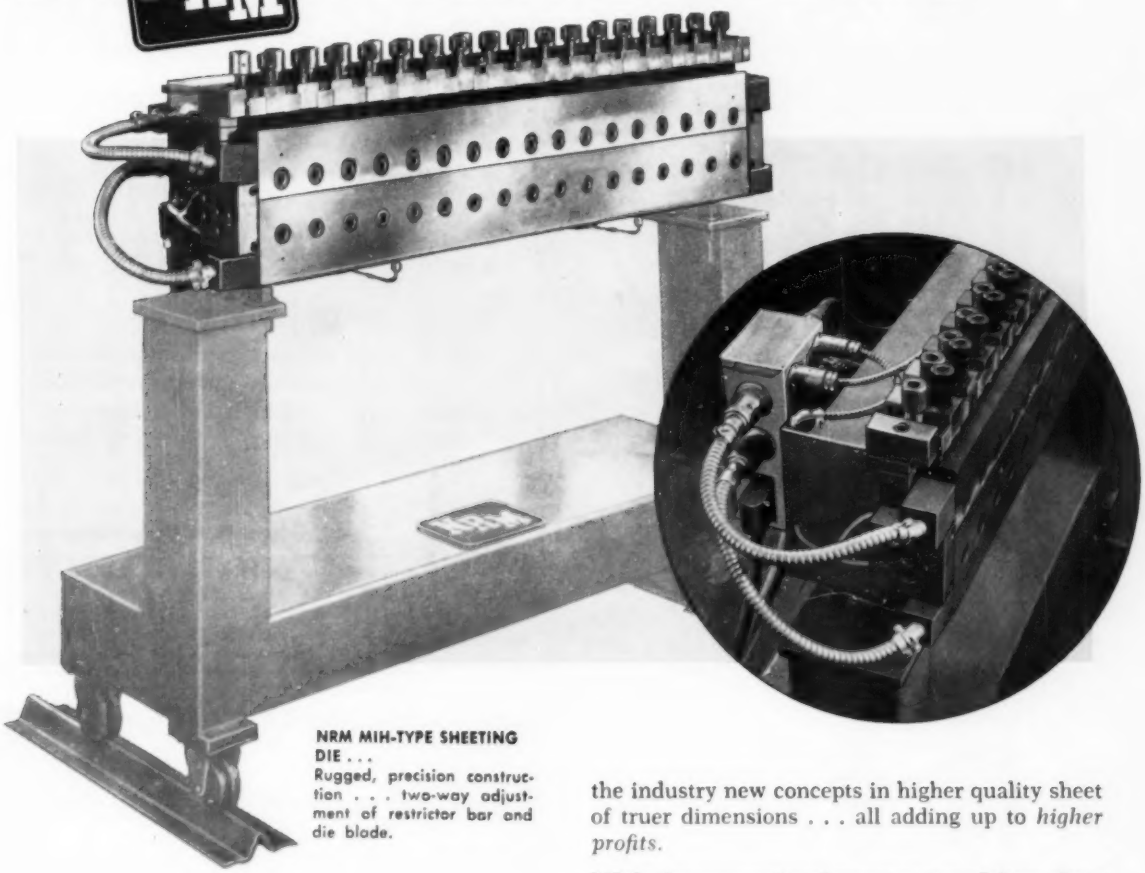
It is estimated that a minimum of 460 boat companies now share this business. However, the big companies are getting bigger and future volume business is expected to lie with but a handful.

Technologically, the next step in this market is greater automation of production, which today is mostly hand layup. From the point of view of quality, there is need for the establishment of standards by which the public can judge what it is buying.

One marine use of reinforced plastics is falling off—fast: a protective covering. This is one of the earliest reinforced applications, and is estimated by Cadillac Plastic & Chemical Co. to have been used on close to 1¼ million wooden boats. However, the market is now shrinking as fewer wooden and more RP hulls are produced each year.

Motor transport: the growth situation in motor transport, reinforced plastics' third transportation market, is a combination

Extrude rigid and elastomeric PVC sheet with NRM SHEETING DIES



NRM MIH-TYPE SHEETING DIE . . . Rugged, precision construction . . . two-way adjustment of restrictor bar and die blade.

NRM Sheeting Dies are engineered, developed and provided with features that set *new highs* in ruggedness and precision of construction so vital to close-tolerance extrusion of thermoplastic sheet at high production rates.

They are designed specially for such materials as high impact Polystyrene, high density Polyethylene, Acrylics, Cellulose Acetate, Butyrate, and including both rigid and elastomeric *Polyvinyl Chlorides*. They use to the fullest, the high production capacities of NRM Extruders, and offer the industry new concepts in higher quality sheet of truer dimensions . . . all adding up to *higher profits*.

While the conventional gauge range of these sheet dies is for plastic sheet from .040″ to .200/.250″, the extreme ruggedness and precision of their construction permit gauges as thin as .008″ and as thick as .500″, under certain conditions. Up to 48″ trim widths are standard, larger widths available on request.

In considering dies for your sheet extrusion set-up, consider the long engineering background, the design advantages, and the great versatility of NRM Sheeting Dies and make yours NRM! A postcard brings you full engineering details and performance data.

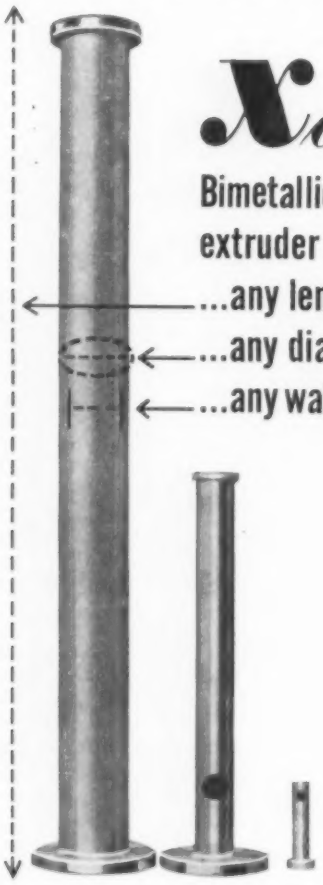
2055-A

NATIONAL RUBBER MACHINERY COMPANY

General Offices and Engineering Laboratories: 47 West Exchange St., Akron 8, Ohio
SOUTH: The Robertson Company, Rutland Building, Decatur, Ga.
WEST: S. M. Kipp, Box 441, Pasadena 18, Cal.
CANADIAN: F. F. Barber Machinery, Ltd., 187 Fleet St., West, Toronto, Ont.
EXPORT: Omni Products Corporation, 460 Fourth Ave., New York, N. Y.

Creative Engineering

XALOY... used for a quarter of a century... worldwide



Xaloy

Bimetallic extruder cylinders

...any length

...any diameter

...any wall thickness

Xaloy production and engineering facilities are the largest in the world devoted *exclusively* to bimetallic extruder cylinders. Xaloy cylinders are designed to increase your output, expand your production time, cut your replacement costs and reduce your down-time. *Xaloy...original equipment on all leading extruders—and the logical replacement for every extruder.* Write for new Xaloy Engineering Data Guide.

INDUSTRIAL RESEARCH LABORATORIES

Division of Honolulu Oil Corp.
961 East Slauson Ave.
Los Angeles, Calif.

RONA™

SYNTHETIC

PEARL PIGMENTS

FOR COMPOUNDING INTO

- POLYETHYLENE
- POLYSTYRENE
- VINYL
- ACETATE
- NITRATE
- ACRYLICS
- CASEIN
- POLYESTERS
- PHENOLICS (CAST)
- ACRYLICS (CAST)
- POLYPROPYLENE and other resins

COATING ALL SURFACES

Rona Pearl Pigments are heat and light stable, non-reactive, non-corrosive, and impart high pearly luster, exceptional depth and brilliance at very low cost.

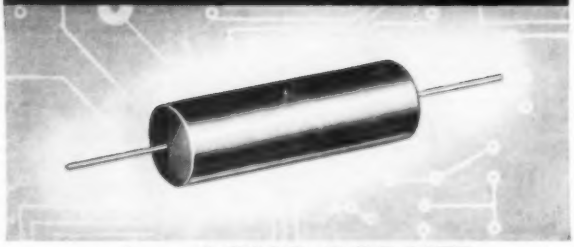
RONA PEARL CORPORATION

A Division of Rona Laboratories, Inc.
East 21st and East 22nd Sts., Bayonne 5, N. J
Manufacturers of Pearl Essence exclusively
Plants: Maine • New Jersey • Canada

TONOX

EPOXY CURING AGENT

for encapsulating electrical components



gives LONG POT LIFE

- minimum vapor hazard and skin staining
- low cost
- high strength
- high heat distortion point
- high moisture resistance

Write for information

Naugatuck Chemical

Division of United States Rubber Company
215X Elm Street, Naugatuck, Connecticut

Rubber Chemicals · Synthetic Rubber · Plastics · Agricultural Chemicals · Reclaimed Rubber · Latices
CANADA: Naugatuck Chemicals Division, Dominion Rubber Co., Ltd., Elmira, Ontario · CABLE: Rubexport, N. Y.

of those existing in the aircraft and missiles field and in boats. It explains why auto and truck use is considered to have the greatest potential, with the possible exception of the construction market. Not only are there a great many more auto and truck parts in which reinforced plastics can and will be used, but these parts can go into many more cars. However, with the exception of the Corvette and certain sports cars with their reinforced plastics bodies, pleasure cars today average in the neighborhood of only 3 lb. of these materials.

The Heil Co., a leader in the use of reinforced plastics for truck tanks and trailers, estimates that there are in service today from 1500 to 2000 trucks in which all, or substantially all, of the main tank or body structure is reinforced plastics. There are from 2500 to 3000 additional trucks where the cab or some other larger section is of reinforced plastics.

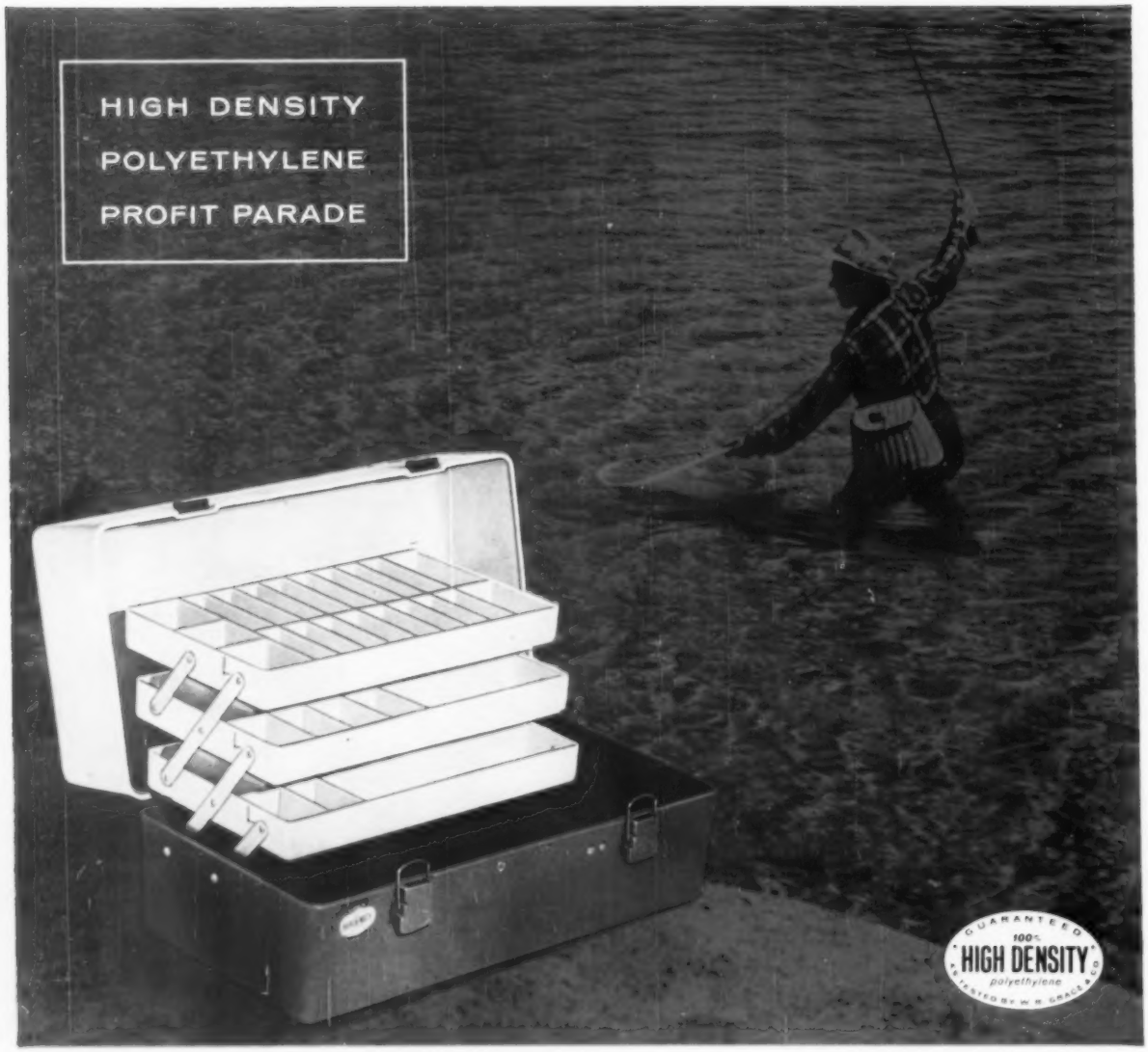
White Motor Co. uses RP cabs on its Series 5400 truck-tractors. Put into service in October 1958, there are now over 600 of these reinforced plastics cabs on the road. Their success may be judged from the fact that White plans "greatly increased production for 1960 and the use of more and more fibrous glass and similar light weight materials in various parts of the truck."

Advantages of these materials in their order of importance to White are: 1) a 30% weight saving compared to steel, permitting greater payload; 2) a 75% saving in tooling cost, again compared to steel; 3) resistance to rusting and ease of repair; and 4) greater design freedom, which is important in the truck manufacturing field. Increased driver comfort is yet another plus factor. These reinforced plastics cabs have been found to be warmer, quieter, roomier because they can be shaped to conform more closely to engine components and, in parts like the "dog house," more rigid and stronger than metal because of one-piece construction.

The ability to localize accident damage is also an important factor. Recently, in going around a flat trailer parked on the high-

TAKE YOURSELF TO THE LEADER
when you want the very whitest
whites, the brightest pastels.
And the leader, of course, is
UNITANE® OR-342 Titanium Dioxide.

CYANAMID
AMERICAN CYANAMID COMPANY
PIGMENTS DIVISION
30 Rockefeller Plaza, New York 20, N. Y.
Branch Offices and Warehouses in Principal Cities



Fishing Tackle Maker Gets a New Angle on Plastics

Many manufacturers are now looking to Grex high density polyethylene for new products and new profits. One such company is B. F. Gladding Co., Inc., manufacturers of quality fishing lines since 1816. Gladding's choice of the Grace plastic for a new line of tackle boxes marks a major innovation in the company's products.

To Gladding, high density polyethylene has proved to be a truly remarkable material. The Gladding Grex Tackle Boxes are tough and rigid—withstand the roughest treatment without breaking, shattering, cracking or denting. Drop one in the water, and it floats. Spill battery acid, oil, gasoline, bug repellents or silicones on the box. Such chemicals—normally harmful to other materials—wipe clean from Grex without staining, softening or marring the finish. Changes in temperature or weather will not cause warpage. Salt water will not corrode. These new boxes will still look new even after seasons of rugged use.

What more could a fisherman want? Or for that matter, what more could you want in a high grade plastic that can be economically fabricated to keep manufacturing costs down and profits up? Find out more about high density polyethylene by calling in the experts. Grace has the production facilities, technical service and experience to help put your product in the Grex profit parade. Everyone says we're easy to do business with.

Grex is the trademark for W. R. Grace & Co.'s Polyolefins.

W.R. GRACE & CO.
POLYMER CHEMICALS DIVISION
CLIFTON, NEW JERSEY

Can high density polyethylene be used in existing molds?

Of the seven molds used to produce Gladding's tackle boxes, six were originally built for a material other than high density polyethylene. Modifications were required in cooling and gating.

Proper cooling. When designing molds for high density polyethylene a prime consideration is to obtain as small a temperature gradient as possible across the face of the mold. In this case, additional channels were cut into the molds, flow of existing channels was changed and bubblers were put opposite each gate. These modifications served to bring the coldest water closest to the hottest material for more uniform cooling.

Conversion to multi-gating. The molds as originally built utilized a single direct sprue gate. This system was changed to multi-gating by the use of a hot runner which provided better control over material temperature. With smaller sprues, the need for three-plate mold construction was eliminated and valuable daylight was saved for easier removal of parts.

As a general rule, proper cooling and gating of molds for high density polyethylene can pay off on four counts: (1) control of warpage and shrinkage, (2) faster cycles, (3) reduction in induced stresses and strains, (4) greater uniformity in density of molded parts.

Do we know all the answers? We have the experience with high density polyethylene on our side—and are learning more every day. Grace has solved problems involving all types of molding, from toys weighing a few ounces to pieces of three and four pounds. Our Clifton Laboratories are equipped to handle almost any molding job. We sincerely want to place our experience and facilities at your command. If you have an application for high density polyethylene, now's the time to contact:

Technical Service Department
W. R. Grace & Co., Clifton, N.J.

way, the driver of one of these trucks misjudged the distance and caught the corner of the flat trailer with the right front cover of the tractor. While head lamp and cab frame assembly were torn off in the collision, the impact damage was confined to the point of contact. As can be seen in the photo on p. 86, there was no frame distortion. It was not even necessary to re-adjust the door. Repairs took only 4 hours. White reports that "had this been a cab of conventional metal design, we know from experience that the door would have had to be bent into a square position to get a suitable fit—an expensive and time-consuming operation. Also, distortion carries throughout the entire frame of a metal cab and, in many cases, makes the repairing of a cab impractical," according to the company.

The 36 parts of the regular White cab and an additional 8 parts for the sleeper cab are all matched metal die molded by the Molded Fiber Glass Body Co.

Mack Truck states that it has molded cabs on test around the country, and such other truck companies as International and Diamond T are rumored to be following suit.

Seating: Reinforced plastics seating is showing up today wherever service conditions are severe—in buses, subways, bowling alleys, schools, institutions. New York City, which has pioneered the use of these materials in public transportation, now has 600 of its fleet of 2000 buses fitted with such seats. They are standard equipment on all new buses, including the 190 put into service in 1959 and the 305 the Transit Authority hopes to have the funds to purchase in 1960. Such seats are also starting to go into subway cars. While initial costs are about the same as for other seats, vandalism, which formerly cost from $200,000 to $300,000 a year, is practically eliminated.

The growing size of the school seating market may be judged by the fact that one molder alone is turning out several thousand chairs a day. And use of reinforced plastics in bowling alleys, where the greatest volume goes into seats, has been estimated at close to $2 million in 1959, with a growth potential of approximately $1 to $2 million a year over the next 3 or 4 years.

Consumer products: The big news in reinforced plastics for consumer products is Swayder Bros.' decision to use these materials for its Samsonite luggage. Fishing rods and other sports goods, furniture, home accessories, all continue on the upgrade. Perhaps only in the protective helmet and safety equipment field do manufacturers anticipate no substantial future growth in use of reinforced plastics over the next five years.

In consumer goods and even more in appliances, finishes figure heavily as a factor in increased acceptance of reinforced plastics. Without exception, materials manufacturers and processors are agreed that headway is being made in achieving a better surface and a more durable finish. Further, the public is coming to accept some show of fiber pattern. Pressure bag molded water softener tanks are the single biggest present use of reinforced plastics in the appliance market, but better-surfaced, better-handled premix and molding materials are going to play a very important future role.

Construction: The potential for reinforced plastics in this area is staggering—but it continues to be a potential. The year 1959, however, saw no radical breakthrough or development.

The use of corrugated and flat paneling was up again last year, amounting to 75 or 80 million sq. feet. It is estimated that about 85% of this sheet was produced by 10 top companies. As in the boat market, the large manufacturers are expected to increase their take of the sales with the small companies subsisting on local business.

This year there may be one big new factor in the field. U. S. Plywood is considering plans to distribute through its 115 wholesale warehouses of "Acrilux," a reinforced acrylic panel made by Wasco. The industry as a whole expects this material to broaden the RP paneling market, not cut into polyester sales.

Opinion is divided on recent

CADET
ORGANIC
PEROXIDES

BENZOYL PEROXIDE

LAUROYL PEROXIDE

2, 4 DICHLOROBENZOYL PEROXIDE

TERTIARY BUTYL HYDROPEROXIDE

METHYL ETHYL KETONE PEROXIDE

Your Assurance of the Highest Uniform Performance

Prompt Shipment from Warehouse Stocks in Principal Cities

Distributed by

CHEMICAL DEPARTMENT
McKESSON & ROBBINS, INC.
Dept. MP, 155 E. 44th St., New York 17, N. Y.

Manufactured by

CADET CHEMICAL CORP.
Burt 1, New York

Write Now! A local McKesson & Robbins Chemical Department representative will be pleased to call and talk over your Organic Peroxide requirements.

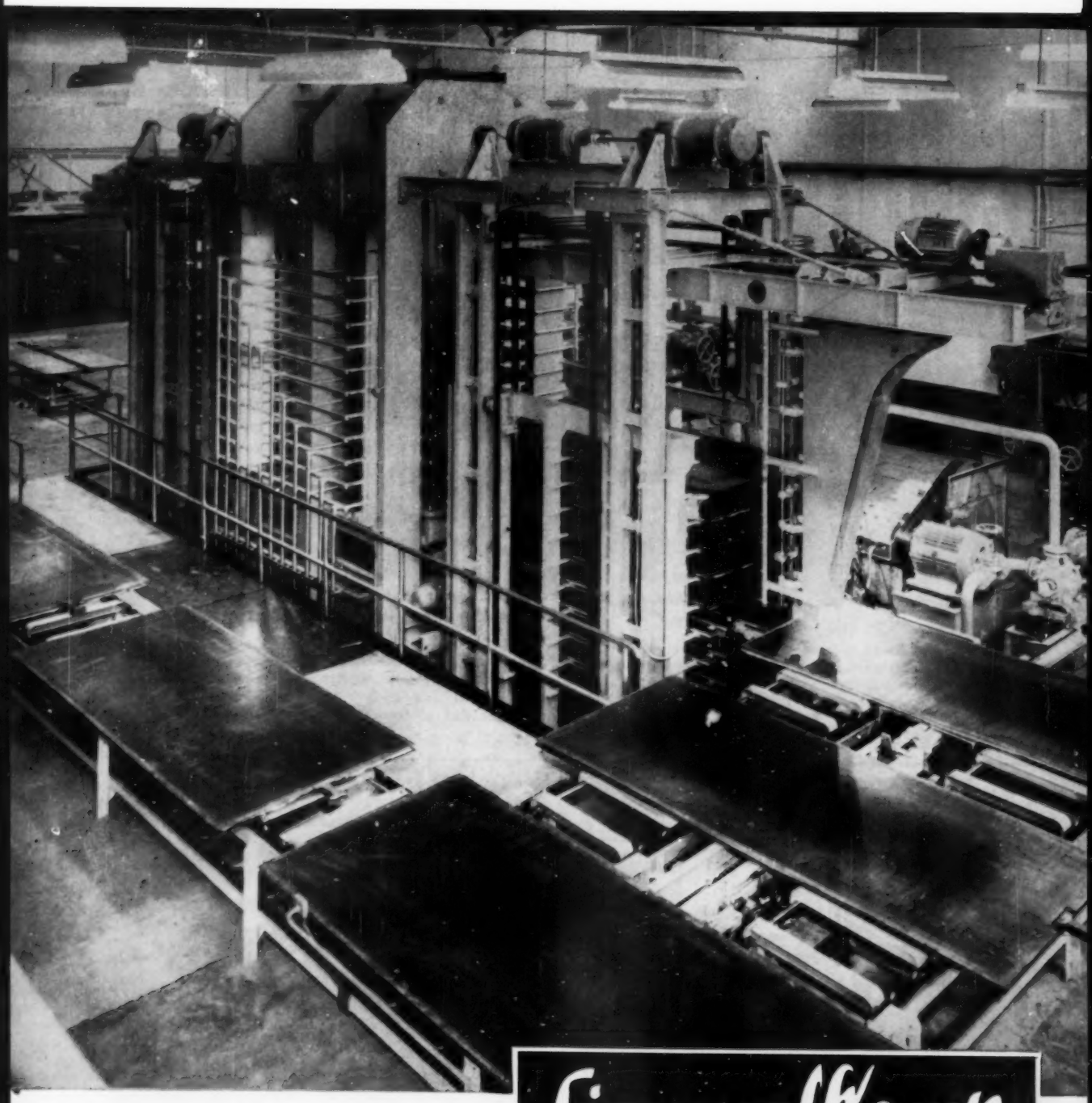
progress in reinforced sandwich structures. U. S. Rubber cites Russell Reinforced Plastics' highly decorative panels, which are said to be giving stained glass a run for its money; and Kalwall's plastic-faced aluminum grid structures as examples of advances in the construction field. Reinforced sandwich panels with plastic foamed or honeycomb cores also are said to be expanding their use at a rapid rate in office interior panels. Opinion as a whole, though, is that at the moment there is more development work than sales.

Standards are needed

Building codes, most of them written before reinforced plastics appeared on the market, are a very considerable factor in the growth rate of these materials in building. Work is in progress, both on the materials and the codes, to insure that more of the proper materials go into future construction. But more effort is needed to develop more and meaningful standards, test data, and design information.

This need applies not alone to construction materials but to all types, forms, and uses of reinforced plastics. One step in this direction is the recently published "Marine Design Manual for Fiber Glass Reinforced Plastics," the end product of an engineering and test program of several years' duration sponsored by Owens-Corning Fiberglas Corp. and directed by Gibbs & Cox, Inc., naval architects and marine engineers. The data can also serve as a guide, it is said, in the development of virtually any structural reinforced plastics product outside the marine field.

Other work is going on, but it is low and fragmentary. Too often in the plastics industries' vigorous action comes only after a material's improper use results in tragedy or a market is lost. How much sounder it would be financially to use standards to insure user satisfaction and open new markets, rather than to reclaim markets that are lost or jeopardized by misapplication. There are numerous markets for reinforced plastics ready for just such an opening key.—**End**



Siempelkamp

Special hydraulic presses

for the plastics industry
for any pressure and temperature
with automatic loader and unloader

Largest Manufacturer Specialising in Steam Heated Presses

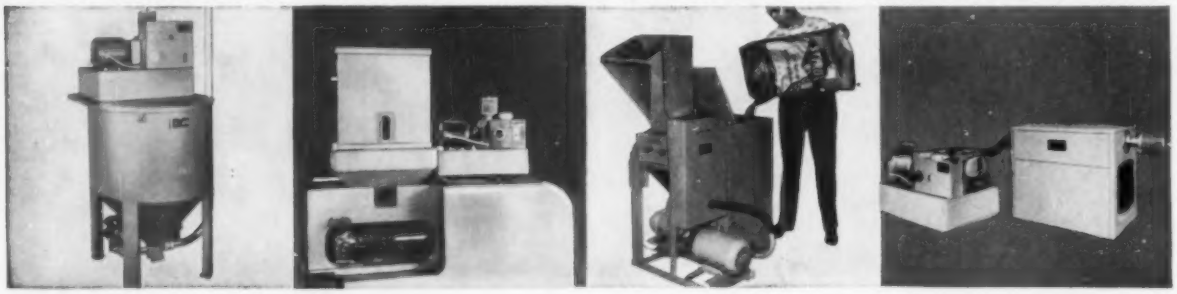
G. Siempelkamp & Co. · Maschinenfabrik · Krefeld Western Germany

Cable address: Siempelkampco

Teleprinter: 085 3811

THORESON-McCOSH, INC.

SERVING THE PLASTICS INDUSTRY



1 Hopper-dryer and Jet hopper loader

More production, lower costs, higher products quality because of properly controlled conditioning of material, no compressed air. Easy installation in minutes.

2 Thoreson-McCosh Hopper-dryer

Dries and preheats material at less cost than conventional drying ovens. Easy installation on standard injection and extrusion machines. No compressed air.

3 Shearway granulator, blender and loader

Granulates and loads in one operation. With our Hopper-dryer it is the most effective drying, loading, granulating, blending unit obtainable. No compressed air.

4 Thoreson-McCosh new Hi-dri unit

Simple mechanical (no chemicals) dehumidifier for use with our Hopper-Dryers on extremely hygroscopic materials under high humidity conditions, inexpensive.

For complete information write today. THORESON-McCOSH, Inc., 18208 W. McNichols, Detroit 19, Michigan, KEnwood 1-4700

PRODUCT	SIZE OF CAN	COST PER OZ.	LOWEST COST OF CAN	QUANTITY YOU HAVE TO BUY TO GET LOWEST PRICE
SPRITS	20 Oz.	.05	$1.00	12
Imitator A	12 Oz.	.11½	1.37	144
Imitator B	20 Oz.	.0875	1.75	48
Imitator C	20 Oz.	.0625	1.25	288

NOW ORDER SPRITS

...has everything its imitators have... yet it's ½ the price!

- Ends Sticky Molds
- Ends Marking or Injuring
- Ends Surface Marring
- Ends Labor & Time Waste

World's best formula: made of DuPont Freons and Dow - Corning Silicones. NON-TOXIC, NON - INFLAMMABLE. Reaches all cavities: improves surface finish.

SEND FOR **FREE** 20 OZ. Sample USE THIS ORDER COUPON

SPRITS 146 Merrick Road, Lynbrook, N. Y.

Send SPRITS as follows:

- ☐ Free Sample
- ☐ Lots of 12 or more, $1.00 per can
- ☐ Lots of less than 12 cans, $1.25 per can

Company Name_____

Address_____

City_____ Zone____ State_____

Ordered by_____

F.O.B. Lynbrook, N. Y.

EXPERIENCED MOLD MAKING

THE WILCOX WAY TO LOWER PLASTIC COSTS!

Precision mold making in our own shop by our own skilled toolmakers is a big factor in the WILCOX ability to offer you savings of 10 to 60% on your small plastic parts. Our special tooling methods plus a wide range of experience in injection molding of thermoplastics (up to 6 ounces) can meet your needs for speed, precision and economy.

LARGE STOCK OF FIXTURES—all jobs get the benefit of our large stock of mold sets and special fixtures to provide low initial tooling costs.

MINIMUM COST MOLDS—Wilcox plastic molds are designed and hardened to meet your tolerance and quality specifications. Any extra operations are eliminated.

Get more details in New Catalog #5904 today

Wilcox PRODUCTS COMPANY

3453 Dakota Ave. Minneapolis 16, Minn.

'Without' core

(*From pp. 92-94*)

the radome. De-icing occurs with no danger to the delicate electronic gear.

High-temperature epoxy resins have played an important part in the development of the new style radomes. The epoxies allow the temperature of the hot-air to be sharply increased, up to 425° F. in some cases, reducing the weight of air that must be passed through the radome for a given heating load. Smaller channels, or flutes, may be used.

In the case of the radome for the DC-8, Douglas uses Epon 828, an epoxy formulation with meta-phenylenediamine as the hardener. Three different Fiberglas cloths go into the construction: 181 glass fabric for the skins, 120 fabric for the hot-air flutes, and a 1584 weave for the doublers that reinforce the area where the sandwich connects with a hinged aluminum mounting flange. All cloths have a Volan A finish.

How they are built

First step in the fabrication of the radome is to lay up layers of impregnated glass cloth to form the outer skin of the finished sandwich. The cloth is tailored and draped inside the female section of a large set of matched dies (Fig. 1, all illustrations appear on pp. 92-94).

After the outer skin has been laid down, the first layer of flutes is formed by pressing into place a series of wax bars, approximately ⅓ by ⅓ in. in cross section, wrapped in impregnated glass tape (Fig. 2). These Fiberglas wrappings will form, when cured, the sides of the air channels. They will also act as the structural core for the finished sandwich.

On top of this row of wax bars is laid a second set of bars at right angles to the first (Fig. 3). The inner-skin plies are then positioned on the inverted male plug (Fig. 4). It was found that less movement of the wax bars occurred and a smoother inner skin surface resulted if this procedure was followed, rather than building the complete sandwich within the female mold. The male plug is then lowered into position (Fig. 5), clamped, and heat applied (Fig. 6). The initial cure cycle is at 115° F. overnight, which is sufficient to bind all the segments of the radome into a cohesive unit. The next morning the male plug is removed and wax drain holes drilled at the ends of each flute. The die is then reassembled, and a second overnight cure affected at 180° F. This is below the melting point of the wax, but the wax does expand, and the holes allow the excess to escape without distorting the flutes.

The radome shell is now firmly bonded together and can be safely removed from the tool. The next step is to melt out the wax in the flutes. The radome is put into a holding fixture in an inverted position, and rolled into an oven set at 225° F. At this temperature, the wax liquefies and rapidly flows out of the drain holes in each flute.

The epoxy laminations are now ready for a final cure, which starts at 2500° F. and increases in temperature at a rate of 50° per hour up to 400° F. The radome is held at the high level for one hour and then allowed to cool.

Final step is to trim the radome along the outer circumference. The radome, which is hinged for easy access to the radar equipment, must match exactly the aerodynamic contours established by the metal fuselage. A metal attached ring is riveted to the plastic shell as a last assembly step. Weight of radome is 75 lb., without metal and attachments.

The epoxy surface is scuffed to clear it of parting agent and gloss. Lightning strips of aluminum foil are bonded to the outer skin in radial lines from nose to attachment ring. A pre-painted surface of filled epoxy is rubbed in and allowed to cure. The final surface is an epoxy-based paint, two to three thousandths of an inch thick. Weathering and erosion tests, simulating an inch-per-hour rainfall at 250 m.p.h., have proved that the epoxy paint is superior to a sprayed neoprene coating 10 thousandths of an inch thick.

The unreserved success of the new sandwich structure holds promise of widened areas of application in other than aircraft uses.—**End**

staflex
plasticizers and stabilizers

STAFLEX® KA

We point with pride to our many fine
Phthalate
Adipate
Azelate
Sebacate
and
Ricinoleate
Plasticizers

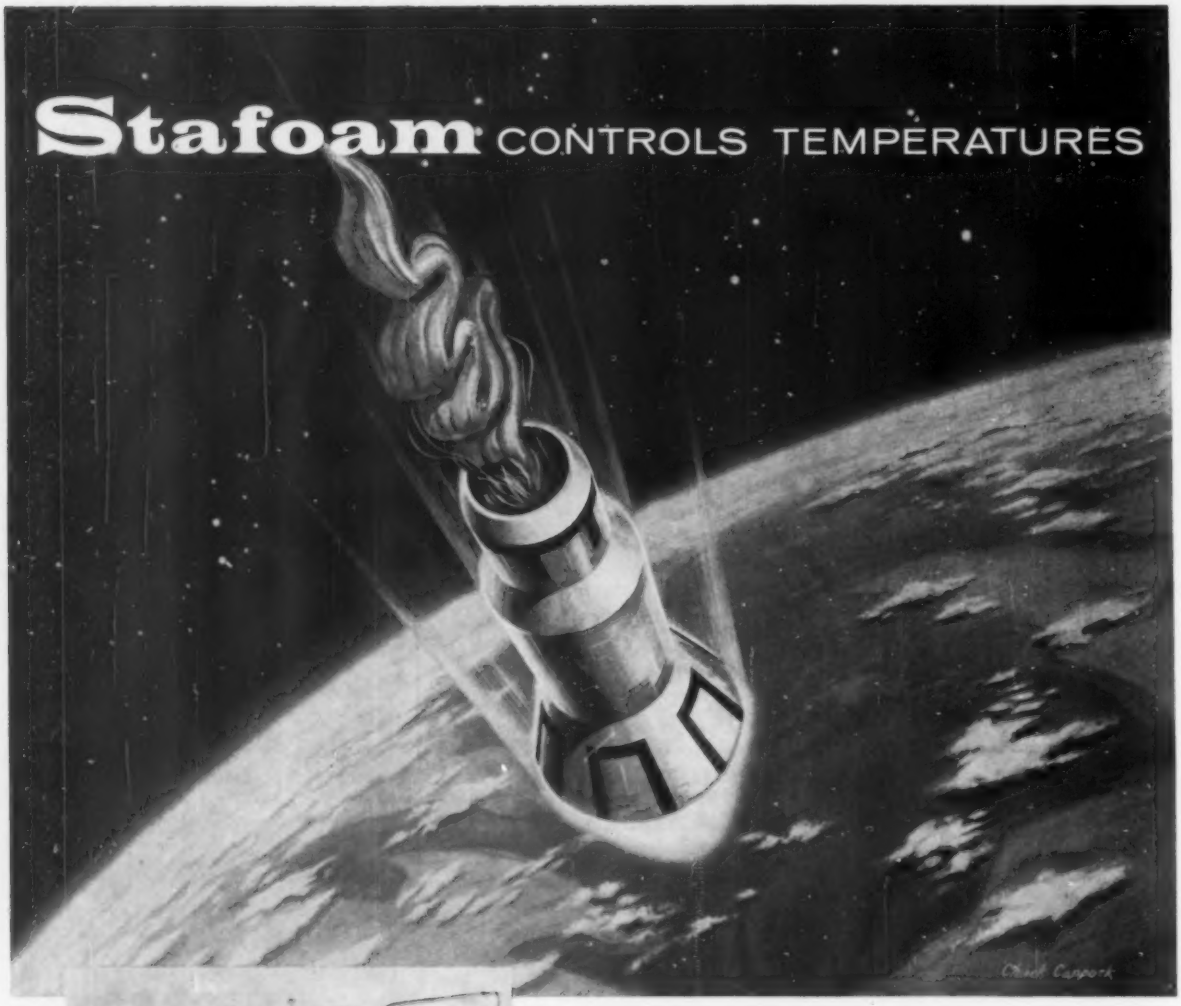
May we explain their advantages to you — to help you to a better product.

Time-proven stabilizers are readily available for sampling.

Why not inquire today?

DeeCy
PRODUCTS CO.
Plasticizers and Stabilizers
120 POTTER STREET
CAMBRIDGE 42, MASS.

Stafoam CONTROLS TEMPERATURES



Hot or cold—inside or out!

STAFOAM, the miracle urethane insulator, has achieved its place in space, protecting men and intricate machinery against the fury of unearthly temperature ranges. Reentry capsules, like the one pictured above, are being insulated with *poured-in-place* rigid STAFOAM. Arctic shelters, missile *defrosting* mantles, refrigerator trucks, environmental fuel chambers, and airline food containers are only a few of the hundreds of new STAFOAM structural insulating applications.

Manufactured in slab stock or poured in place by...

Above: New successful environmental fuel and missile component test chamber constructed with *poured in place* Stafoam.

From temperature controls to cryogenics, the Freedlander R & D Laboratories can provide new dimensions in material technology.

stafoam
REG. TRADE NAME

AMERICAN LATEX PRODUCTS CORP.

3341 West El Segundo Blvd., Hawthorne, California
ORegon 8-5021 OSborne 6-0141

BRANCHES: San Francisco, 42 Gough St.; Seattle, 2231 5th Avenue; Dallas, 1300 Crampton St.; Houston, 401 Velasco; Omaha, 3304 N. 48th Avenue

A DIVISION OF THE DAYTON RUBBER CO.
Headquarters for New Ideas

D R

STAFOAM RIGID	STAFOAM FLEXIBLE	POLYRUBBER	POLYPOT	DAYCOLLAN
Thermal insulation	Aircraft & conveyance seating	Personnel shock padding	Instrument potting	Gear, roller bearings, O rings
Acoustic dampening	Commercial cushioning	Instrument & motor mounts	Crystal clear windows & mtrls.	Instrument & control knobs
Foam core construction	Shock padding (high hysterisis)	Elastomer coupling	Control knobs & accessories	Instrument scope boots
Helmets and liners	Clothing insulation & liners	Oxygen hose and masks	Electronic encasing	Airless wheels & tires
Packaging & flotation	Air & liquid filtering	Window and hatch gasketing	Applicable hardware	Applicable hardware

Resin-gun system

Sunbeam Alpine made by Rootes Group Ltd., Coventry, showing wrap-round, rear window made from 'Perspex' acrylic sheet, by P.D.I. Limited, Birmingham.

More and more 'Perspex' is being used in modern cars

IN modern cars great use is being made of 'Perspex' acrylic sheet—are you making full use of this truly outstanding material ? 'Perspex' offers excellent clarity in clear form as well as an extremely high degree of light transmission in tinted form. It is light in weight and can be formed to smooth, modern, streamlined shapes. Another great advantage 'Perspex' offers is toughness. It has long been established that 'Perspex' stands up to weather conditions throughout the world. Finally, 'Perspex' is a handsome, longlasting material, a material modern car owners are glad to have in their cars.

3-litre Rover made by The Rover Co. Ltd., Solihull, showing sun visors made from coloured 'Perspex' acrylic sheet by E. F. Tanner & Co. Ltd., Rhayader. On each of the four doors are side louvres made from clear 'Perspex'.

The Pexidome Co. Ltd., London, design and fit this hard top, made from 'Perspex' acrylic sheet, to Austin Healey cars.

'PERSPEX'

'Perspex' is the registered trade mark for the acrylic sheet manufactured by I.C.I.

Imperial Chemical Industries Limited, Plastics Division: Export Dept., Black Fan Road, Welwyn Garden City, Herts.

U.S.A. enquiries to: J. B. Henriques Inc., 521 Fifth Avenue, New York 17, N.Y.

Canadian enquiries to: Canadian Industries Ltd., Plastics Division, Box 10, Montreal P.Q.

P750/O/A

Custom Molding and Fabricating

PRE-MIX

REINFORCED PLASTICS

Design • Engineering • Production

LARGE & SMALL QUANTITIES • ALL SIZES

FIRMALINE

Ideas
•
Design and Engineering
•
Technical Experience
•
Highest Quality
•
Economical Production
•
Dependable Delivery

Firmaline formulates and compounds its own "premixes" of glass fiber or organic fiber reinforcement utilizing the newest polyester and epoxy resins. Compounded for specific requirements, they result in optimum properties while permitting most efficient molding in our high speed presses.

ALL MOLDING AND LAY-UP TECHNIQUES EMPLOYED

OFFICES

PHILADELPHIA AREA — 30 E. Cedar Ave., Merchantville, N. J.
WASHINGTON, D. C. — 1413 "K" Street, Washington, D. C.
SOUTHEASTERN AREA — 2100 Ailor Ave., P.O. Box 3207 Knoxville, Tenn.
SOUTHWESTERN AREA — 1215 E. 20th St., Tulsa 20, Okla.

A Subsidiary of Kaysam Corporation of America

FIRMALINE PRODUCTS, INC.

10 Pierce Ave., Midland Park, N. J.
Gilbert 4-1156

Want to help tomorrow's business leaders?

To—MODERN PLASTICS
575 Madison Avenue
New York 22, N.Y.

Yes, I'd like to donate my last year's Encyclopedia to a student. Please send me a forwarding label made out for this purpose, and I'll do the rest.

Name _____

_____

Company _____

_____

Address _____

_____

There's a great need for MODERN PLASTICS ENCYCLOPEDIAS to be used as reference and textbook material by students in university and other plastics courses.

If you'd like to forward your copy of last year's issue to such a student just fill out the coupon and mail it to us. We'll send you, in return, the name of a student or instructor who wants your book—with an address label all made out.

Joel Frados
EDITOR

P.S. The response of MODERN PLASTICS' *subscribers to previous requests for student copies has been truly enthusiastic. Several thousand copies of earlier Encyclopedia Issues have thus far been distributed to students in our schools and universities!*

Resin-gun system

(From page 95)

In effect, the trend is towards the mating of a gun with a resin, producing a "system."

The particular features of the "resin only" guns are: 1) resin delivery at any rate up to 35 pounds per minute; 2) gel time uniformity due to pre-blending at the gun nozzle; 3) minimum overspray; 4) minimum atomization; 5) low pressure operation; 6) minimum ventilation requirements; 7) minimum maintenance and 8) the ability to deposit resins at distances from one to six feet.

How system works

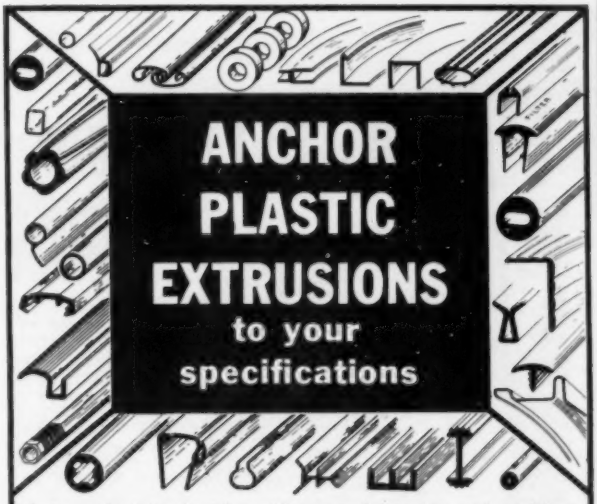
After deck and hull molds are waxed and polished, they are sprayed with a 10 to 15 mil shellcoating film. When the shellcoat has gelled, promoted, and catalyzed, resin is sprayed on. A ply of glass reinforcement, carefully cut to pattern, is positioned and rolled into the resin. The result is a solid, void-free skin coat. Extreme care is taken with this step, for air voids here would be costly to correct.

When the skin coat has gelled, more resin is spray-applied and pre-tailored glass reinforcement rolled in. This "plying" of reinforcement varies according to the boat size.

When the hull and deck laminates have cured firmly, seats and longitudinal reinforcements are molded to the hull and stiffeners are molded to the underside of the decks. Cured hulls and decks are then pulled from the molds, and moved to the assembly area. There hardware is installed, and hulls and decks are buffed to a high gloss finish.

Tomahawk Boat Co. found that one gun operator could service three boat-layup crews, and the crews were kept busy, eliminating man downtime, thus cutting labor needs by 25% as compared to pouring resin and rolling it in. The company used 378 lb. of resin for each boat as against an average of 400 lb. by pouring, saving an average of 22 lb. per hull. And on the same tools Tomahawk turned out 14 boats in the same time it used to take them to make 10.—**End**

Exciting New



ANCHOR PLASTIC EXTRUSIONS
to your specifications

Custom extruded rods, tubes, strips, curved extrusions and mouldings . . . manufactured to meet high quality standards.

Have you considered . . .

PLASTI-BRASS* & PLASTI-GOLD* mouldings, like polished brass, gold, copper or chrome. *TM

ANCHOR's thorough experience assures you of 100% satisfaction in even the most complex fabricated extrusions . . . and ANCHOR's "know-how" means you get a first class product at minimum cost. Send us your prints for prompt quotation.

WRITE FOR DESCRIPTIVE BROCHURE "Extruded Plastics"

ANCHOR PLASTICS CO., INC.
36-36 36th St., Long Island City 6, N. Y. RA 9-1494

NEW DECOR-STIK
The Glamorous, Economical Method of
PRODUCT DECORATION, TRIM OR IDENTIFICATION
METALIZED MYLAR AND VINYL COMPOSITION WITH PRESSURE-SENSITIVE ADHESIVE BACKING

UNLIMITED USES:
- DECORATIVE TRIM • PANELS OR GRILLES
- IDENTIFICATION NAMEPLATES
- COLOR SPOTS OR FOCAL POINTS

Rugged! Economical! Practical!

DECOR-STIKS are obviously cheaper than metal—and application of metal to product. Have extra durability and long life—will not tarnish, fade or stain—cannot peel or crack.

PLAIN, PRINTED OR EMBOSSED . . .

All patterns are available in four standard colors: copper; chrome; gold or brass.

Write today for complete data and samples of colors and patterns. Also get FREE copy of 48-page full color "IDEAS IN ACTION", crammed with illustrations and case histories—newest data on unusual application for labels and seals.

allen hollander company, inc.
385 Gerard Avenue, New York 51, N. Y.

Provides Acid-Resistant **PLUS** for Phenolic and Polyester Resins

Powminco Asbestos Fibers

America's most Inert Filler

Powminco Asbestos is the *only completely fiberized acid-resistant asbestos fiber in the United States.*
Made exclusively by the Powhatan Mining Company, it is now widely used as a filler and an absorbent and extender in phenolic and polyester resins.
Powminco Asbestos, practically inert (95% insoluble), is unaffected by as much as four hours boiling in concentrated hydrochloric acid. It is this quality that gives it a distinct advantage over ordinary chrysotile fiber in molding compounds (such as phenolics) that require an acid catalyst, and in casting resins.
Because it contains so little water (it's an anhydrous magnesium silicate), unusually low shrinkage results when POWMINCO ASBESTOS is used in molding and tooling operations.

Offers Exceptional Advantages
Excellent heat resistance, very high dielectric strength and extremely low magnetic iron plus high absorption, easy "blendability" and *low cost* conclusively guarantee POWMINCO ASBESTOS as the finest filler you can buy.

POWMINCO

POWHATAN MINING COMPANY
6723 Windsor Mill Road
Baltimore 7, Maryland
Cable address: Powminco

So that you can see the advantages of Powminco Asbestos Fiber in your own operations, we will be glad to send you a working sample (for use with any resin) without cost or obligation. The coupon below will be given our prompt attention.

Powhatan Mining Company
6723 Windsor Mill Road
Baltimore 7, Md.

Please send me a working sample of Powminco Asbestos Fiber.

NAME .....
.....
.....
TITLE .....
COMPANY .....
.....
.....
STREET .....
CITY .....
ZONE ..... STATE .....

Another example of FIBERITE at work

Exciting New Curing Agent

BF_3 MEA

✓ *has much longer pot life*

✓ *gives excellent high temperature cures*

In curing epoxies and other resins, Allied Chemical's BF_3MEA (Boron Fluoride Monoethylamine Complex) offers many advantages over other commercially available hardeners. Here are a few:

Extremely long pot life! Where other curing agents harden in days, hours or only minutes at room temperature, BF_3MEA stays liquid for months.

Excellent latent catalyst for high temperature cures. 200°-300°F.

Excellent heat distortion temperature. 300°-360°F at standard testing conditions (264 p.s.i.).

Small quantities do the job. You need only 1 to 5 parts of BF_3MEA per hundred parts of resin!

Many uses! BF_3MEA (also known as Epon Curing Agent® BF_3-400) has been used in casting, potting, laminating and adhesive-bonding applications with excellent results. Recent developments show that it can also be used with some solid as well as liquid resins. Other nitrogen complexes of Boron Trifluoride also offer many advantages as latent catalysts. It will pay you to investigate these new curing agents *now!*

Some Physical Properties of BF_3MEA:

Melting point ..... 90°-98°C.
Physical aspect ..... white crystals
Solubility ..... soluble in water and benzene, acetone and methyl ethyl ketone. Insoluble in chloroform. Soluble in liquid epoxy resin within 10 minutes at 85°-90°C.

Mail coupon for technical data, samples. Attach to company letterhead, please.

Allied Chemical

Baker & Adamson® Fine Chemicals
GENERAL CHEMICAL DIVISION
ALLIED CHEMICAL CORPORATION
40 Rector Street, New York 6, N. Y.

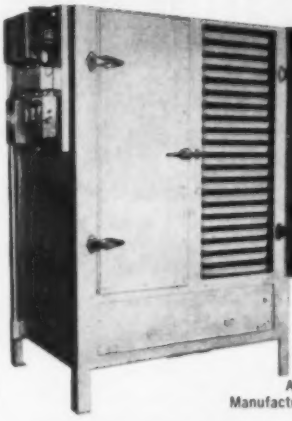
☐ Please send technical information on use of BF_3MEA and other nitrogen complexes of Boron Trifluoride in epoxy resin curing.

☐ Please send sample of BF_3MEA. MO-20

Name _____
Position _____
Company _____
Address _____
City _____ Zone ____ State ____

For your needs in accessories

FOREMOST designs-



A TIGHT OVEN

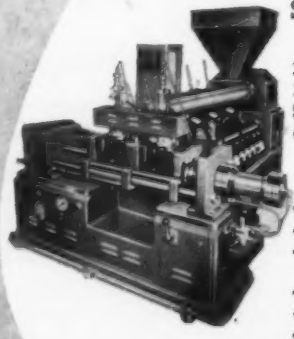
For really efficient drying, this is the tightest oven constructed. When used in conjunction with a dehumidifier connected to the intake, 99% of the air will come through the dehumidifier. Ovens that have been designed without this factor considered will leak as much as 30% room air into the system. This is the first plastic drying oven supplied with fiberglas and polyester molded trays which are indestructible, easier to clean, and cooler to the touch. Available in 40 and 20-tray, electric only. Manufactured by Foremost Machine Builders, Inc. Livingston, New Jersey, and sold by:

The Rainville Company
657 Franklin Avenue, Garden City, L. I., N. Y.

DISTRICT OFFICES: Quinebaug, Connecticut; Abington, Pennsylvania; Franklin, Pennsylvania; Detroit, Michigan; Dayton, Ohio; Evansville, Indiana; St. Louis, Missouri; Chicago, Illinois; Minneapolis, Minnesota; Dallas, Texas; Alhambra, California; Toronto, Canada (Husky Manufacturing & Tool Works, Limited).

The key to your plant needs!

KTS **Blow Molder!**
Injection Molder!
Extruder!



Semi Automatic Blow Molder

2-mold model
3-8 pcs/min (cycles)
5"/dia × 11"/hgt
(Size limitation of bottles)

Main Products

- Semi Automatic Blow Molder
- Injection Molder
- Upward Inflation Tubular Film Making Unit
- Extruders - 42, 50 & 75mm
- Extrusion Dies
- Plastic Granulators
- Belt & Tube Take-up Attachments
- Electric Wire Coating Attachments

KATO SEISAKUSHO CO., LTD.
70, 4-chome, Higashi Magome-machi, Ohta-ku, Tokyo, Japan

One-shot polyether

(From pp. 107-110)

on the assumption that the high catalytic activity of triethylenediamine in isocyanate reactions would be useful. This high catalytic activity follows not only from theoretical considerations but has been actually observed in the preparation of polyurethane foams from so-called "dimer acid esters" (polymeric glycol esters of polymerized oleic acid), polyether prepolymers, and also in kinetic studies carried out using the model system phenyl isocyanate-2-ethyl-hexanol-water.

Regarding the mechanism of the base-catalyzed isocyanate reactions, many—but not all—workers accept the theories developed by Baker and collaborators (2). These authors found the reaction between phenyl-isocyanate and methyl alcohol is catalyzed by tertiary amines. Quinoline, pyridine α-picoline, and triethylamine show catalytic activity increasing with base strengths. However, diethyl- and dimethyl aniline are anomalous. Although their base strengths are comparable to that of pyridine, their catalytic activity is negligible. Rate of reaction between an isocyanate and an alcohol (catalyzed or uncatalyzed) depended on amount of excess alcohol present. From these observations, Baker and his coworkers concluded the catalytic action on the rate of reaction by the tertiary amine depends on the product of two factors. The first is the concentration of the complex formed between the catalyst and the isocyanate, which in turn depends on the ability of the catalyst to form such complexes. The second is the rate constant of reaction between the complex and excess alcohol present, leading to formation of urethane and regeneration of the catalyst.

On the basis of this theory, the inactivity of the substituted anilines is ascribed to the configuration of these molecules which, because of steric hindrance, prevents their approach to the isocyanate molecules in the proper direction and to the proper distance, so that the complex cannot be formed in sufficiently high concentration.

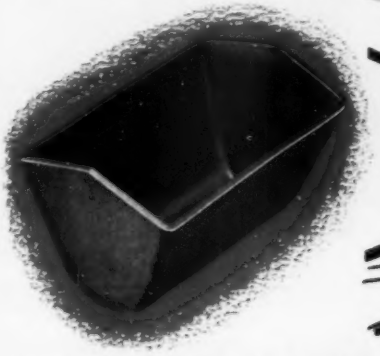
On the other hand, the two

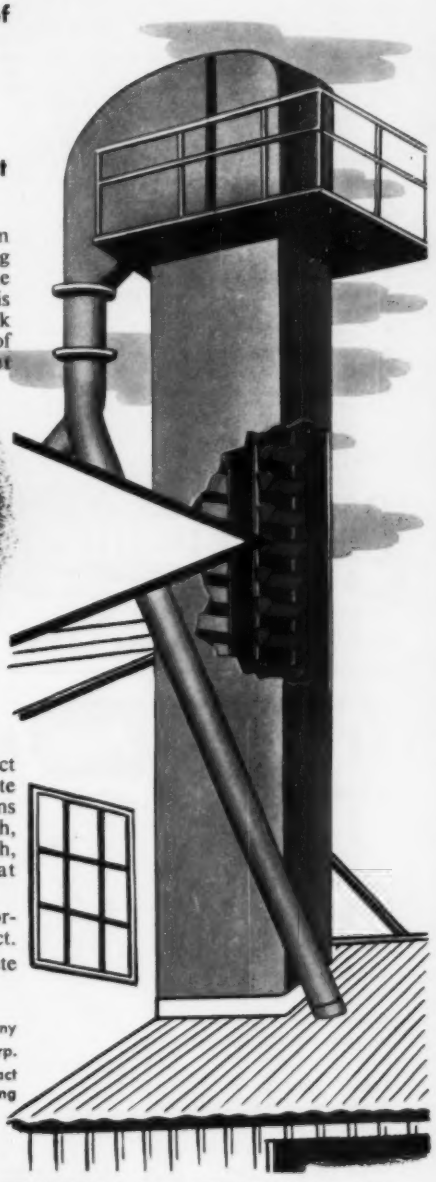
Another example of FIBERITE at work...

ELEVATOR BUCKET OF FIBERITE PHENOLIC

- it is spark and static proof
- it is strong, shatterproof, and will not bend
- it is wear resistant
- it is high speed and lightweight; cannot rust and does not cake

The five major requirements of an efficient elevator bucket were a long time coming. Now, thanks to Fiberite formulation Number FM 3510 it is available to everyone elevating bulk products. This elevator bucket made of Fiberite simply eliminates bucket





worries. Perhaps you have a product problem seeking an answer. Fiberite research has been supplying solutions to products requiring impact strength, flexural strength, compressive strength, tensile strength, dielectric and heat resistance for many manufacturers.

Let us supply data on Fiberite formulations to consider for your product.

Write, wire or phone for complete data on Fiberite formulations.

Product designer: National Oats Company
Molder: General American Transportation Corp.
Molding compound: Fiberite's high impact reinforced phenolic No. 3510. An outstanding 2-step material in the CFI-20 range.

EASTERN OFFICE: 33 Oakland Ave., Bloomfield, N. J., Pilgrim 8-1233.

DETROIT OFFICE: 380 Hilton Rd., Lincoln 8-6017.

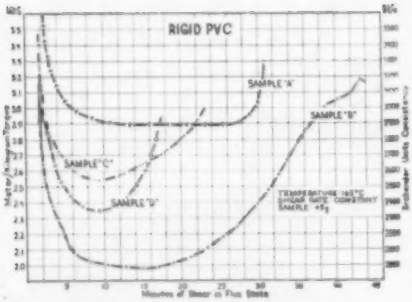
CHICAGO OFFICE: Railway Exchange Bldg., Michigan Ave. at Jackson Blvd. Harrison 7-1164.

WESTERN OFFICE: Riverdale Plastics, 8510 Warner Drive, Culver City, Calif., Texas 0-7733.

NEW ENGLAND OFFICE: 30 Oak Ridge Terrace, Danbury, Conn., Pioneer 8-0684.

CANADA: The Bakelite Co., 40 St. Clair Ave. E., Toronto 7, Ontario.

THE FIBERITE CORPORATION
Manufacturers of Plastic Molding Compounds
Main Office: WINONA, MINNESOTA • Phone 2316



Accurately forecasts processability, saving time consuming plant experimentation, high scrap costs, down time, etc. *Records* plastic flow of all polymers at temperatures to 600°F, and measures as no other flow tester can *under typical processing conditions* . . .

- **Molding and Extrusion Performance**
- **Polymer Stability**
- **Polymer Melt Flow at Various Shears**
- **Effect of Each Additive**
- **Conditions for Color Matching**
- **Decomposition Factors**
- **Temperature-Viscosity Relationship**
- **Average Molecular Weight**

SEE FOR YOURSELF! Bring or send us your samples for free testing. Write for technical application bulletins.

PROCESSING PROBLEMS SOLVED . . .

before production begins with the stepless, variable shear rate PLASTOGRAPH by C. W. BRABENDER

Various measuring heads for all types of material

C.W. Brabender Instruments, Inc.
SOUTH HACKENSACK, N. J.
52 E. Wesley St., Diamond 3-8425

Process Film *Faster for Less . . .*

with the LIBERTY ONE-COLOR PRINTER

Here's How and Why:

Engraved cylinder can be changed in minutes.

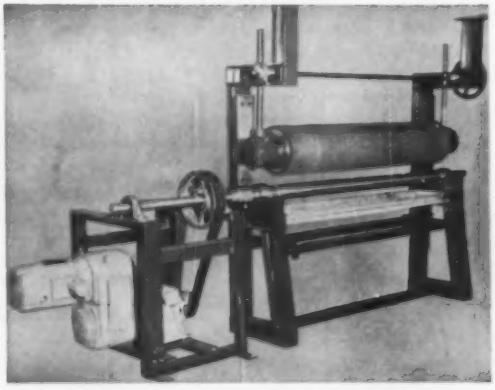
Copper cylinders easily removable—can be washed up while on press.

When printing from doctor blade, press gets under way with only pint of ink. And you need only two, three quarts when using ink pan.

Doctor blade and cylinder always in full view.

All steel construction. Ball bearings throughout.

Width, 48" to 72". Repeats up to 24".



For further details on Liberty's complete range of economical, easy-to-operate processing equipment—including *polishing units, embossers, one and two-color presses,* and *inspection units*—write for Liberty's free catalog!

LIBERTY MACHINE CO. INC.
275 FOURTH AVENUE, PATERSON 4, N. J.

bridgehead nitrogens in triethylenediamine are free of steric hindrance, their electron pairs being sufficiently exposed to allow the formation of the reactive complex with the isocyanate.

In the production of polyurethane foams from dimer esters (1) and from polyether prepolymers (3), it was found that the concentration of triethylenediamine required as the catalyst was only about a tenth as much as required with the conventional amine catalysts. The kinetic studies of the phenyl isocyanate-2-ethylhexanol-water system revealed that the catalytic activity of triethylenediamine is five to seventeen times as large as that of n-ethylmorpholine (4).

However, a closer consideration indicates that increased rate alone does not necessarily permit the formation of a successful one-shot polyether foam unless the individual isocyanate reactions involved in the foaming occur in the proper ratio.

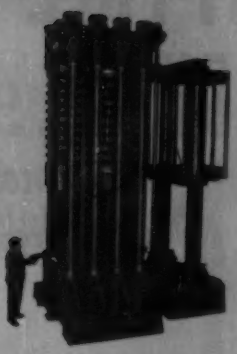
The most frequent and obvious failure observed in the production of polyurethane foams is the collapse of the foam caused by lack of gel strength. In general, this deficiency can be ascribed to the chain growth reaction between the isocyanate groups and the organic hydroxyl groups being too slow compared to the reaction between the isocyanate groups and the water molecules. The latter reaction is responsible for the evolution of carbon dioxide, and causes the foaming. On the other hand an excessively fast isocyanate-hydroxyl reaction would make the mass too viscous to allow the full development of a uniform foam structure.

It appears therefore that triethylenediamine is not only a fast catalyst but accelerates the two critical reactions in such a way that they occur at relative rates that are favorable to the formation of foam.

It is also believed that, because of its more or less spherical shape, showing no protruding side chains or substituents, the triethylenediamine molecule can maintain its high catalytic activity for the two isocyanate reactions to a proper relative level even as the molecular weight and thus the viscosity

R. D. Wood Plastic Laminating Press produces superior sheets with minimum "idle" time

Plastic sheets with superior surface finish, uniform thickness and exceptional strength characteristics result every time you laminate, cure or polish with a Wood Press. So regularly, in fact, that you take superior performance for granted. But here's a Wood that gives you an added bonus—savings in time! While the press is closed, curing ten-sheet packages, ten additional packages can be prepared for processing and inserted in alternate openings of the 20-opening elevator. Dual operation speeds loading and unloading . . . keeps press in constant operation. No down time. No lost motion. A natural for every plastics manufacturer.



R. D. Wood 2,700 ton hydraulic press for laminating, curing and polishing plastic sheets. Press has 10 openings; 11 platens—38" x 74" x 3½". Height above floor level, 12'1". Floor space, 8'6" x 14'1". Weight, 225,000 pounds. Furnished with steam or electric-heated platens. Available completely self-contained or accumulator operated. Write today for catalog and engineering information.

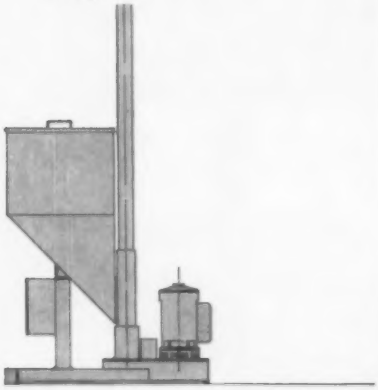
R. D. WOOD COMPANY

PUBLIC LEDGER BUILDING • PHILADELPHIA 5, PENNSYLVANIA

DUST-FREE LOADING...

WITH WHITLOCK SCREW-TYPE CONVEYORS

- Automatically stops material flow when hopper is full.
- Easy installation — no attachment to press.
- Ideal for phenolics, melamines, ureas, alkyds, vinyls and similar resins.
- Capacities from 150 to 1000 lbs./hr.



Whitlock hopper-dryer — dries air to —20 dewpoint.

Air conveyors use plant air — capacities to 2,500# per hr.

For complete literature send to

Whitlock ASSOCIATES INC.

21653 COOLIDGE HWY. OAK PARK 37, MICH.

☐ Air conveyors ☐ Screw-type conveyors ☐ Hopper-Dryer

Name _____

Title _____

Firm _____

Address _____

of the mix tends to increase in the course of the reaction. Thus the action of triethylenediamine may be visualized as some kind of a "rolling" from one reactive group to another.

Conclusion

Using triethylenediamine as the sole catalyst, polyether urethane foams of good physical properties can be prepared according to the one-shot technique without having to resort to the preparation of prepolymers. Good foams were obtained from polypropylene glycol alone or in mixtures with triols, both in hand mixes and foam machine runs, with 0.4 to 0.85 parts of triethylenediamine per hundred parts of the polyol present in the mix.

Acknowledgment

The results reported in this paper were obtained in the course of a development program on urethane foam catalysis at the Houdry Process Corp. The physical evaluation of the foam samples was carried out by Messrs. C. G. Harriz and W. J. Savournin, Jr. The authors are indebted to Dr. G. A. Mills and Mr. J. B. Maerker in their continued and encouraging interest in this study.

References

1. Aylesworth, R. D., Boehringer, R. H., Moore, D. T., and Smith, M. H., Modern Plastics *36*, 145, (May 1958).
2. Baker, J. W., and Gaunt, J., Journal of the Chemical Society, 1949, 9, 19, 27; Baker, J. W., and Holdsworth, J. B., ibid., 1947, 713.
3. Erner, W. E., unpublished research results.
4. Farkas, A., and Flynn, K. G., reference material now in the course of publication.
5. Ferrari, R. J., Sinner, J. W., Bill, J. C. and Bruksch, W., F., Industrial and Engineering Chemistry, *50*, 7, 1041 (1958).
6. Flexible Urethane Foam: ASTM Designation D 1564-58T.
7. Hoppe, P., Weinbrenner, E., Muhlhausen, C., and Breer, K., United States Patent 2,764,565, Reissue 24, 514.
8. Saunders, J. H., Steingiser, S., Gemeinhardt, P. G., Morecroft, A. S., and Hardy, E. E., C & E Data Ser. 3, 1, 153 (1958).—End

are code names confusing you?

Would you prefer to relate surfactant performance to chemical composition?

KESSLER POLYGLYCOL ESTERS

provide the chemist with the opportunity to investigate the effect of Stepwise Variations in Surfactant Composition on emulsification, wetting or other surface-active application. This extensive series of surfactants includes Oleate, Stearate and Laurate esters of Polyethylene Glycols, ranging in molecular weight from 200 to 6000.

Our Technical Service Laboratory welcomes the opportunity to assist you in the application of these products

KESSLER CHEMICAL CO., Inc.

7298 State Road, Philadelphia 35, Pa.

ESTERS FOR INDUSTRY Since 1921

Only in Plastics could they make

The Incredible Visible Man

Overall height 15 inches

Designed and Merchandised by Renwal Blueprint Models Mineola, New York

Only by the SHAW PROCESS could the molds be made with Faithful Reproduction, Speed and Low Cost

Imagine the exactness of detail required to have 67 pieces of varying shapes and sizes fit together easily and perfectly.

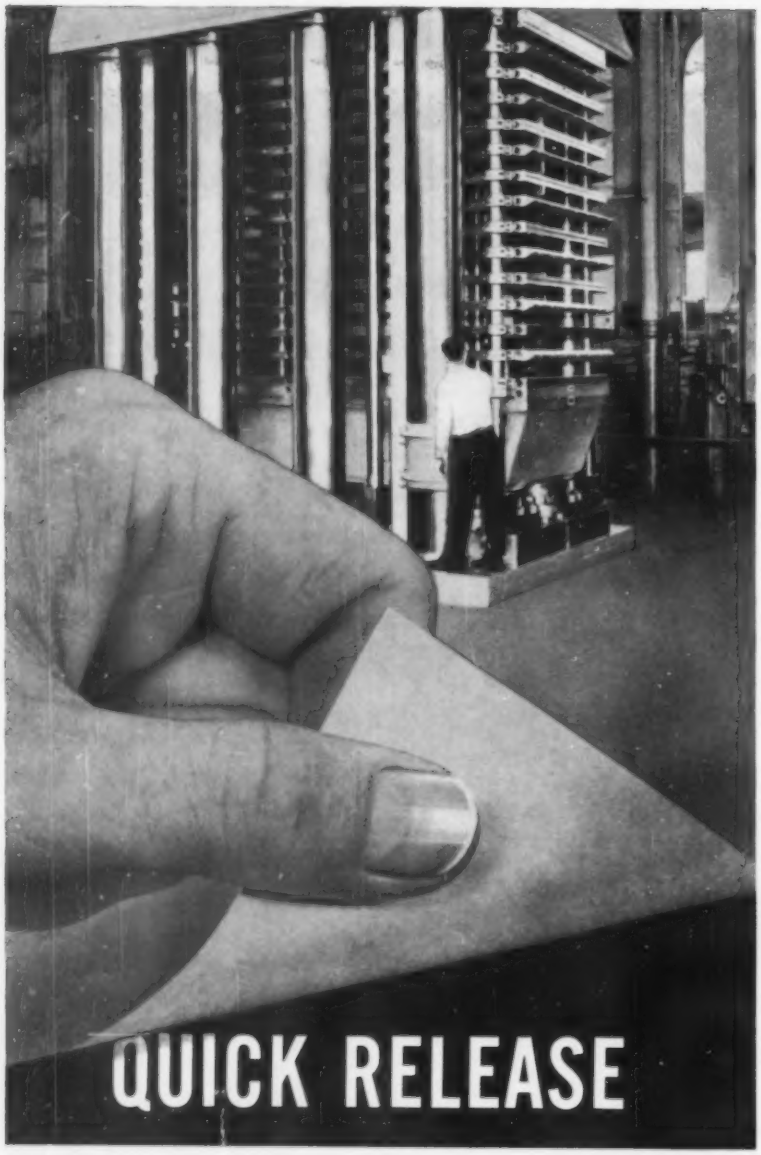
Molds for these 67 pieces were ***reproduced by the Shaw Process from the original Plaster models***—carefully engineered into 3 basic molds having Beryllium Copper Cavities.

Just think of the hours of machining time saved—this meant a big saving in both time and money in getting this complicated project started.

A combination of Standard's engineering know-how and experience in production gained in 48 years might easily be valuable to you.

STANDARD TOOL CO. 213 Hamilton Street, Leominster, Massachusetts

OMNI PRODUCTS CORP., Export Distributor, New York, N. Y.



after curing, vulcanizing, polymerizing, casting, calendering

Patapar® Releasing Parchments stay strong during your heating cycle . . . let go when you want quick, clean separation.

Patapar resists penetration and keeps its release characteristic indefinitely.

"Patapartness" is proving invaluable to makers of pressure-sensitive adhesives, synthetic rubber, polyurethane foams, polyesters, vinyl, organosols, phenolics, acrylics, and plastisols. See for yourself. Send for free samples of Patapar Releasing Parchments.

Press Photo Courtesy Baldwin-Lima-Hamilton Corp.

Patapar®
RELEASING PARCHMENT

75th ANNIVERSARY
SPECIALTY PAPERS FOR PROGRESS
SINCE 1880

PATERSON PARCHMENT PAPER CO.
BRISTOL, PENNSYLVANIA
Sales Offices: New York, Chicago • West Coast Plant: Sunnyvale, Cal.

Static charges

(From pp. 120-124)

1) Nitrogen compounds, e.g. long chain amines, amides, and quarternary bases or salts.

2) Sulfonic acids and aryl alkyl sulfonates.

3) Phosphoric acids and aryl alkyl phosphates.

4) Polyglycols and their derivatives, including polyglycol esters of fatty acids and polyglycol aryl alkyl ethers.

5) Polyhydric alcohols and their derivatives.

Anti-static agents may be incorporated into resins by compounding or they can be used as a surface coating. Coatings of anti-static usually are not permanent as they may be washed or worn off.

Bibliography

Anon., "Problems of Electrostatic Charges in Plastics." Brit. Plastics, pp. 335-37 (Aug. 1955).

Feehery, G. R., "The Measurement and Control of Static Electricity on Plastic Webs," E. I. du Pont de Nemours & Co., Inc., Sales Service Laboratory, Polychemicals Dept. Report TR #32, November 14, 1958.

Institute of Physics, London, "Static Electrification," A Symposium, March 25-27, 1953. Brit. J. of App. Physics. Supplement No. 2.

Moore, C. B., "The Electronic Filament Coulometer." Gordon Research Conference, (July 1958).

Sears, F. W., Zemansky, M. W., College Physics, Addison—Wesley Press, Inc. (1948).

Sipple, A., "The Significance and Elimination of the Electrostatic Charge on Textile Fibers." Melliand Textilberichte 35, 831-35 (Aug. 1954).

Skinner, S. M., Gaynor, J., and Sohl, G. W., "Electrostatic Charges in Plastics." Modern Plastics (Feb. 1956).

Steiger, F. H., "Evaluating Antistatic Finishes." Textile Res. J. 28, 721-23 (Sept. 1958).

Sully, B. D., "Electrostatic Charges on Polyvinyl Chloride." Brit. Plastics 29, (March 1956).

Woodland, P. C., Ziegler, E. E., "Static Dust Collection on Plastics." Modern Plastics 28, (May 1951).—**End**

to demonstrate injection molding at a BIG store...

MACY'S

it takes a BIG machine...

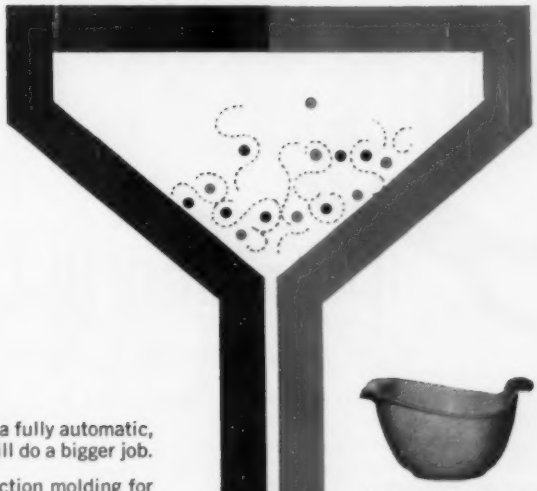
DE MATTIA'S

There are bigger injection molding machines than the De Mattia fully automatic, fully hydraulic 4/6 oz. Model K-2...but none in its class that will do a bigger job.

And when Macy's, the world's largest store, demonstrated injection molding for its customers, the completely self-contained K-2 was the machine used. It was used steadily, in fact, for 24 hours a day for a full month, turning in a performance superior in every respect.

It is this dependability, plus fast production, ease of operation, top efficiency and lower costs, that has made the De Mattia 4/6 oz. Model K-2 the first choice of leading manufacturers.

For increased production and lower costs in your plant, look into the Model K-2 today . . . write for complete specifications.



DEMONSTRATION AT MACY'S – Production of 5½-oz. mixing bowl in linear W. R. Grace's polyethylene shown in the store's houseware department on De Mattia fully hydraulic 4/6 oz. Model K-2 injection molding machine.

DE MATTIA MACHINE & TOOL CO. • Main Office and Plant: CLIFTON, N. J.

Sales Representatives: ACME MACHINERY & MFG. CO., INC., 20 So. Broadway, YONKERS, N. Y.; 102 Grove Street, WORCESTER, MASS.; 522 W. North Ave., CHICAGO • BROSITES MACHINE CO., INC., 50 Church Street, NEW YORK 7

STAMPING
ON PLASTICS
GOT YOU "UP IN THE AIR"

GENERAL
LUSTROGOLD
24 Karat Gold Leaf

Its extra brilliance and greater durability make more and more manufacturers turn to LUSTROGOLD genuine gold leaf. LUSTROGOLD is ideal for hot stamping on plastic because it provides finer definition ... superior coverage ... easier work-ability.

Write for sample & illustrated literature

GENERAL ROLL LEAF
Manufacturing Co.
Genuine and Imitation Gold and Silver, Pigment and Metallic Colors
85-03 57th Ave. Elmhurst, L. I., N. Y. HAvermeyer 9-6123
BOSTON • CHICAGO • LOS ANGELES

NEW!
Vertical Injection
Molding Machine
Compact - Swift - Safe

Mercury by PROGRESSIVE

CHANGE MOLD AND CYLINDER IN MINUTES!

New way to profitable insertion contact and plug molding. Available in 1 oz. and 2 oz. capacities per plastic shot with exclusive sliding table giving operator more freedom of movement in positioning inserts. Full push button control. No levers. Less operator fatigue, more production.

Table moves swiftly in and out between platens. Production, 600 cycles per hour. Highest mold accuracy. Occupies absolute minimum of floor space. No operator risks.

Mold sets for these units cost approximately half conventional sets. Profitable on long or short runs.

Complete details and brochure on request.

PROGRESSIVE TOOL & DIE CO.
530-17 Boston Turnpike
Shrewsbury, Massachusetts

363-9

Microstructure

(From pp. 134-135)

plus ammonium hydroxide, ethyl alcohol, or acetone did not aid in developing the layers. Actually, it was found that these techniques frequently smeared or distorted the enamel layers.

Microexamination

Sample mounts were examined and photographed at a magnification of 500 diameters. In order to bring out distinctly the enamel layers the sample mount was oriented on the stage plate so that the scratches produced by the fine grind or rough polish operation were parallel to the light path. It was necessary to use oblique illumination to bring out the enamel layers for microexamination as well as for the photography of the samples.

The photomicrographs vividly show the number and thickness of enamel coatings on coated wire of Types A and C (Figs. 1, 2, 3, 5, 6). In the case of Type B enamel (Fig. 4), no layers were observed after several attempts on different samples. It appeared that the enamel in each pass was not sufficiently cured before the next pass was made through the enamel. Later tests, however, indicated that the mechanism of the curing reaction was different from that of enamel Types A and C. Thus, the thermoplastic nature of Type B enamel resulted in homogeneity of the enamel coating after each layer was added and heated to effect curing. In any event, the enamel appears as a single thick layer (Fig. 4). Many of the physical properties of this enamel, such as stress cracking, are reminiscent of those properties that are observed when wire enamel coating is applied in single thick layers.

The data on the enamel build and thickness of each enamel layer are summarized in the data in Table I, p. 134.

Accurate measurement of the enamel build requires that the wires be mounted perpendicular to the face of the mounting material. When comparison is made between two samples or even two different specimens of the same sample, it is necessary to examine the enamel around the wire to ascertain whether the coating is symmetrical on the wire.

Shrinkage of enamel by 6 hr. additional heating at 150° C. is shown for Type C wire by the decrease in the thickness of the enamel coating in Fig. 6 (compare these findings with Fig. 5). Examination of each of these coatings around the wire established the uniformity of the build.

This photomicrographic method of studying the insulating enamel on magnet wire offers many advantages that heretofore were not available.

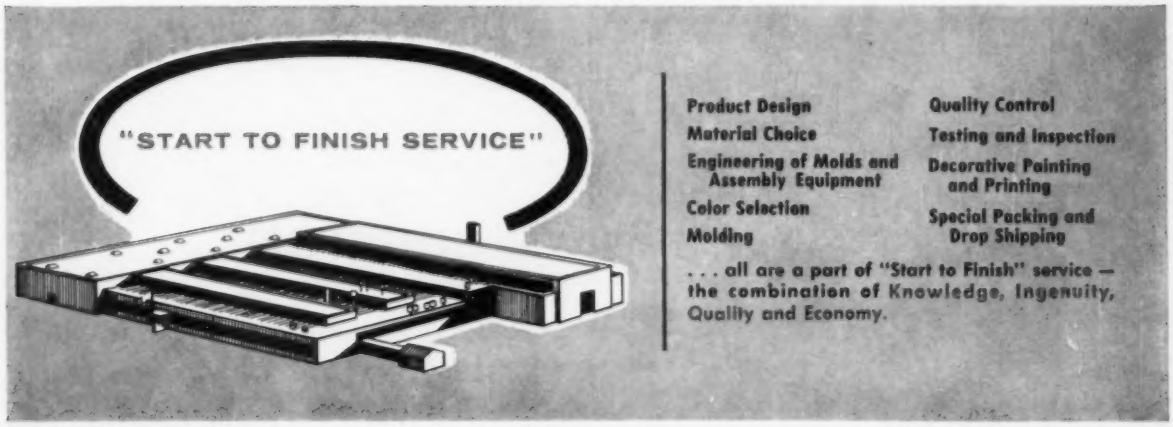
The presence of discrete layers, the number and thickness of enamel coatings, and the symmetry of the enamel build can all be readily determined. The shrinkage or physical breakdown of an enamel during operation can be studied. Valuable information concerning the physical properties of an enamel may be predicted by either the presence or absence of enamel layers.—**End**

KNOWLEDGE

INGENUITY

QUALITY

ECONOMY


"START TO FINISH SERVICE"
Product Design
Material Choice
Engineering of Molds and Assembly Equipment
Color Selection
Molding
Quality Control
Testing and Inspection
Decorative Painting and Printing
Special Packing and Drop Shipping
. . . all are a part of "Start to Finish" service — the combination of Knowledge, Ingenuity, Quality and Economy.

MINNESOTA PLASTICS CORPORATION

45 EAST MARYLAND AVENUE • SAINT PAUL 17, MINNESOTA

PRODUCTS Can Grow Old Gracefully too

HARCHEM SEBACATE PLASTICIZERS WILL GIVE YOURS THIS UNIQUE QUALITY

Extend the life and the original looks of your products and you build customer good will that reflects itself in greater sales and profits. Nothing will give them more stability, more protection against the inroads of age than Harchem Sebacate Plasticizers. Whether you seek resistance to heat, cold, water, weather or physical abuse, the key to your problem can be found in the chart of four Sebacic Acid Esters found below.

Plasticizer	Specific Gravity 25°/25°C ± .003	Viscosity 25°C, cps	Compatible With	Outstanding Characteristics
Dibenzyl Sebacate	1.055	21-22	Polyvinyl Chloride and Copolymers, Polyvinyl Butyral, Synthetic Rubbers	Excellent Solvation, Very Low Volatility, Permanence, Good Electricals, Low Temp Flexibility
Dibutyl Sebacate	0.935	7.9	Vinyl Resins, Cellulose Acetobutyrate, Synthetic Rubbers, Rubber Hydrochloride, Polymethyl Methacrylate	Low Temp Flexibility, Excellent Aging Qualities, Non-Toxic
Dimethyl Sebacate	0.986*	3.54 @30°C	Vinyl Resins, Synthetic Rubbers, Cellulose Nitrate, Cellulose Acetobutyrate, Acrylic Resins	High Solvency and Efficiency, Wide Compatibility, Concentrated Source of Sebacyl Radical
Dioctyl Sebacate	0.913	17.4	Polyvinyl Chloride and Copolymers, Polyvinyl Butyral, Synthetic Rubbers, Cellulose Nitrate, Cellulose Acetobutyrate	Excellent Low Temp. Flexibility, Low Volatility, Excellent Soapy Water Resistance, Good Electricals

*30°/20°C

WRITE FOR BULLETIN OR CONSULT
CHEMICAL MATERIALS CATALOG PAGES 173-175

THE KEY TO HARCHEM® BETTER PLASTICS

HARCHEM DIVISION

WALLACE & TIERNAN, INC.
25 MAIN STREET, BELLEVILLE 9, NEW JERSEY
IN CANADA: W. C. HARDESTY CO. OF CANADA, LTD., TORONTO

1. SELECT the items you want
2. CIRCLE the corresponding numbers on the post card
3. FILL IN the information requested
4. MAIL — no postage required

HELPFUL LITERATURE FREE

There is valuable data — worth dollars and cents to you — in the literature and samples described below.

EQUIPMENT • SUPPLIES • SERVICES

PROPRIETARY PLASTIC PRODUCTS. 32-page, illustrated catalogue describes lines of plastic products for science and industry such as instrument dust covers, protective medical garments, bottles, dispensers, etc. Specifications, prices. Bel-Art Products. (B-001)

HIGH-IMPACT THERMOPLASTIC RESIN. Illustrated in colour, 12-page brochure describes uses and applications of lightweight, uniform resin, specially suited to the manufacture of products requiring high-impact strength, light weight, etc. Marbon Chemical Div. of Borg-Warner. (B-002)

SLITTER-REWINDER. 4-page illustrated folder describes machine suited to converters which run off-caliper materials, including papers, flexible and rigid plastic foils, films and laminates. Slits and rewinds at high speeds. Cameron Machine. (B-003)

PNEUMATIC PRODUCTION TOOLS. 28-page illustrated file catalogue describes various portable, pneumatic tools and accessories such as die grinders, brushes, buffers, carbide burs, etc. Thomas C. Wilson, Inc. (B-004)

FIBERGLASS BOAT COVERING. 16-page booklet, illustrated, describes features of fiberglass, used in conjunction with plastic resins to form protective laminate or repair coverings for boats. Data. Glass Plastics Corp. (B-005)

ABRASION TESTER & COMPONENTS. 14-page, color catalogue, illustrated, describes instrument and accessories designed to evaluate the resistance of surfaces to rubbing abrasion. Its range of application includes tests of painted, electroplated surfaces to plastic coated materials, etc. Taber Instrument Corp. (B-006)

AIR-OPERATED BRAKES, CLUTCH—PULLEYS. Two, 4-page, illustrated folders describe air-operated brakes for tension control to meet high torque, speeds and horsepower and heat-dissipating requirements. Also, heavy-load, variable speed clutch pulleys. Data. Horton Mfg. Co., Inc. (B-007)

PLASTICS INJECTION PRESS. 2-page illustrated catalogue sheet describes 4-6 oz. automatic plastics injection press. Specifications, data. Van Dorn. (B-008)

FIBREBOARD CONTAINERS. 4-page, illustrated folder describes line of fibreboard containers and tubing in various shapes and sizes. Specifications. Cleveland Container Co. (B-009)

HIGH-IMPACT MOLDING COMPOUND. 6-page illustrated folder describes properties and applications of high-impact phenolic molding compound reinforced with fiberglass. Specifications. Durez Plastics. (B-010)

PAINT STRIPPER. 1-page data sheet describes a material designed for stripping such things as enamels and lacquers, rubber coatings, melamines and vinyl coatings, etc. from surfaces. Dytex Chemical Co. (B-011)

STATIC CHARGE MEASURER. 2-page catalogue sheet, illustrated, describes a meter designed to measure electrostatic charges accurately on plastics, paper, hydrocarbons, and other poor conductors of electricity. Specifications. Data. Keithley Instruments Inc. (B-012)

VACUUM-FORMING EQUIPMENT. 4-page illustrated folder describes line of machinery designed for thermoforming, plastic sheet moulding, containers and covers for packaging, etc. Conapac Corp. (B-013)

HEATING CYLINDER-INJECTION MOLDING. 10-page brochure describes consulting service to plastics industry management dealing with costs and plant operations in the area of heating cylinder and related injection molding problems. Injection Molding Surveys. (B-014)

EXTRUDERS & AUXILIARY EQUIPMENT. 12-page illustrated folder describes features of line of extruding machinery and auxiliary equipment for the plastics industry in the production of such things as tubing, film, sheeting, rods and shapes, etc. Specifications. Data. Sterling Extruder Co. (B-015)

PRESSURE TRANSDUCER. 2-page catalogue sheet describes transducer, specifically designed for use in thermoplastic extrusion processes. Its function is to pump molten material at a constant rate, at uniform temperature. Specifications. Dynamic Instrument Co., Inc. (B-016)

STABILIZER FOR CHLORINATED POLYMERS. 2-page data sheet contains information on an organo-tin sulfur designed to obtain maximum heat and light stabilization for chlorinated polymers. Advance Solvents & Chemical Div. (B-017)

BLOW MOLDING MACHINES. 12 page illustrated brochure describes features of machine developed for the manufacture of blow-molded hollow objects. Kautex-U.S. Sales Co., Inc. (B-018)

SILICONE SPRAY. 16-page illustrated folder describes features of silicone spray developed as a mold release for the plastic and other molding industries. Data. Injection Molders Supply Co. (B-019)

HYDRAULIC PRESSES. 14-page folder illustrated, describes line of production presses designed for compression molding, etc., and laboratory presses, for research and testing. Specifications. Atlas Hydraulics. (B-020)

PLASTICS CATALOGUE. 64-page catalogue lists data and specifications for various plastics like lucite, plexiglas, vinylite, polystyrene, nylon, fiberglas, acetate, mylar, etc., Plastics Div., of Kaufman Glass Co., Inc. (B-021)

MOISTURE TESTER. 6-page, illustrated broadside describes a semi-automatic moisture tester which measures the moisture content of organic or inorganic materials. Data and specifications. C. W. Brabender Instruments, Inc. (B-022)

ANTI-WRINKLE, SLAT EXPANDER. 2 page data sheet describes device to eliminate wrinkles in plastic films and fabrics during continuous roll operations. Kay Machine Co. (B-023)

Fill out and mail this card now

MODERN PLASTICS

MANUFACTURERS' LITERATURE SERVICE

Please send me the free items circled below. ☐ I am a non-subscriber*

I am ☐ a subscriber

B-001	B-002	B-003	B-004	B-005	B-006	B-007	B-008	B-009	B-010	B-011
B-012	B-013	B-014	B-015	B-016	B-017	B-018	B-019	B-020	B-021	B-022
B-023	B-024	B-025	B-026	B-027	B-028	B-029	B-030	B-031	B-032	B-033
B-034	B-035	B-036	B-037	B-038	B-039	B-040	B-041	B-042	B-043	B-044

(Please Print Plainly)

If you do not have a personal subscription and would like to receive the next twelve monthly issues plus the next annual Encyclopedia issue (U.S.A. & Canada, $7.00; all others, $25.00) please check below.

☐ Check enclosed ☐ Send bill

NAME ..... POSITION .....
(Please Print Plainly)

COMPANY .....

STREET ..... CITY ..... STATE .....

(This card cannot be honored after ...)

FREE HELPFUL LITERATURE

There is valuable data—worth dollars and cents to you—in the literature and samples described below.

1. **SELECT the items you want**
2. **CIRCLE the corresponding numbers on the post card**
3. **FILL IN the information requested**
4. **MAIL—no postage required**

EQUIPMENT • SUPPLIES • SERVICES

HYDRAULIC MACHINERY. 20-page illustrated book describes line of standard hydraulic equipment and special precision machinery for customers' specific production requirements in plastics molding industry. Watson-Stillman Press Div., Farrel-Birmingham Co., Inc. **(B-024)**

CUTTING, MEASURING EQUIPMENT. Nine, 2-page illustrated specification and data sheets describe machinery designed for automatic feeding, spooling and measuring, cutting and slitting, etc. RUF Machine Co., Inc. **(B-025)**

POLYSTYRENE MACHINERY. 11 page data and specifications book describes machinery and equipment used in the processing and expansion of polystyrene. Miller & Van Winkle Co. **(B-026)**

PLASTIC INJECTION PRESS. 4-page folder describes features of automatic plastic injection press. Data, specifications, prices. Simplomatic Mfg. **(B-027)**

AUTOMATIC SPRAYING. 2-page illustrated data sheet describes method of automatically spraying 1, 2 or 3 surfaces of oval or rectangular shaped pieces where fine definition is required. Conforming Matrix Corp. **(B-028)**

VACUUM AND PRESSURE BLOWING. 6-page folder describes pumps designed for various uses of vacuum or moderate pressure air. Specifications. Beckfield Rotary Vacuum Blower Co. **(B-029)**

GAS SCRUBBER-FILTER. 6-page, illustrated broadside describes hydro filter used in collection of fine dust, corrosive gases, explosive, incendiary, or toxic dusts, etc. National Dust Collector Corp. **(B-030)**

MIX-MULLER. 14 page illustrated folder describes features of line of machinery designed for intensive mixing action for wide range of materials varying in viscosity and density. Specifications, data. Simpson Mix-Muller Div. National Engineering Co. **(B-031)**

CURING EPOXY RESINS. 2-page illustrated folder gives data on physical properties of a boron fluoride monoethylamine complex used in the curing of epoxy resins. Harshaw Chemical Co. **(B-032)**

TRANSFER MOLDER. Two, 4-page illustrated folders give specification data on 50 ton and 350 ton transfer molding machines. Improved Machinery, Inc. **(B-033)**

EXTRUDED PRECISION SHAPES. 4-page, illustrated folder describes line of plastic extruded shapes and fabricated parts. Bulletin outlines application to three important plastic materials. Specifications, data. National Vulcanized Fibre Co. **(B-034)**

ACRYLIC-TYPE POLYMER. 2-page data sheets give information on a thermoplastic resin for injection molding and extrusion. J. T. Baker Chemical Co. **(B-035)**

VACUUM AND PRESSURE FORMING EQUIPMENT. Seven illustrated catalog and specification sheets describe nine thermoforming machines for packaging and forming products from ¾ inch diameter to 6' x 12.5'. Auto-Vac Co. **(B-036)**

BLOW MOLDING EQUIPMENT. Illustrated 4-page brochure lists specifications and describes components and operations of blow-molding machines with production capacities to 450 pounds of material per hour. Auto-Blow Corp., A Subsidiary of National Cleveland Corp. **(B-037)**

POLYURETHANE ELASTOMER. 22-page technical bulletin on a polyurethane elastomer which will not crystallize and has good creep properties, resistance to hydrocarbons, low-temperature performance, high-temperature stability and abrasion resistance. General Tire & Rubber Co. **(B-038)**

ELECTRICAL GRADE PLASTIC TUBING. 6-page catalog gives stock sizes, specifications and prices for a line of tubings extruded from various grades and types of resins, compounded to meet the requirements of the electrical industry. L. Frank Markel & Sons. **(B-039)**

MOLDING PRESSES. Illustrated 8-page brochure describes and gives general specifications for a line of automatic molding presses ranging from 60 to 450 tons in capacity. Choice of compression or transfer molding at a switch-turn. Baker Bros., Inc. **(B-040)**

CUSTOM EXTRUDING. Illustrated 4-page brochure describes the company's extrusion facilities and equipment. Extruders range in size from 2½ through 6 in. Services include fabrication, and tool and die facilities. Yardley Plastics Co. **(B-041)**

WEIGHING EQUIPMENT. Illustrated 36-page catalog describes a line of weighing machines in capacities from 2000 milligrams to 1000 lbs. Manual, semi- and full-automatic models. Types include precise ultra-visible, basic weight classifier, production, net weighing, checkweighing and a new type for plastics injection molding. Exact Weight Scale Co. **(B-042)**

PLASTICS QUALITY CONTROL. Illustrated 20-page brochure describes the quality controls applied in the production of the manufacturer's Tenite plastics—butyrate, propionate, acetate and polyethylene. Tests for flow, stiffness, hardness, heat resistance, color, transparency, etc. are detailed. Eastman Chemical Products, Inc. **(B-043)**

METAL FLAKE DECORATION. Illustrated 6-page brochure discusses the areas of use for colored metal flakes designed for laminating into plastic sheeting. The Dobeckmun Company. **(B-044)**

Fill out and mail this card now

Postage Will be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY CARD

First Class Permit 2656, New York, N. Y.

MODERN PLASTICS

Village Station Box No. 103

NEW YORK 14, N. Y.

Flexural strength

(From page 138)

pins. The span-to-depth ratio was 16:1, and the beam overhang was initially 1 inch. The beams were milled from ¼-in.-thick IA-UVA Plexiglas sheet, which was part of the same batch of stock used for the tensile and compressive specimens. The beams were loaded with the original surfaces of the sheet in contact with the loading pins.

Tests were conducted on two machines: an Instron tester and a pneumatically operated, high-speed tensile machine (1).[1] A special flexural tool was fabricated which operated between the stationary and moving crossheads of the two machines (2).

The load instrumentation consisted of commercial load cells (wire strain gage type), a d.-c. amplifier, and a cathode ray oscilloscope equipped with camera. Deflection measurements at mid-span were made by utilizing the voltage signal from a linear potentiometer (resolution 0.001 in.). Deflection-time and load-time curves at 74°F. are shown in Fig. 1, p. 138. In each record, the upper and lower curves are the load and the deflection, respectively. Deflection rate was estimated from the degree of slope of the deflection-time curves.

The flexural strength and strain rate for the extreme fibers of the beams were calculated by following the procedure, outlined in ASTM Method D 790-58T, for materials that fracture at comparatively small deflection. This procedure is based on equations derived for elastic bending of beams and its chief value is for making comparisons of flexural behavior between different plastics. Whether the procedure is appropriate for determining ultimate properties for a viscoelastic material is questionable, since many assumptions implicit in the derivation of the equations are violated. It has been shown, also, that strength values are affected by beam geometry (3). Nevertheless, the ASTM method was used to compute flexural properties and it is thought that **(To page 202)**

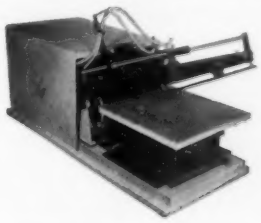
[1]Numbers in parentheses link to references at end of article, p. 202.

Get all the advantages of screen process marking . . . with MARKEM

MACHINES...SCREENS...INKS...SERVICE

To mark your plastics products with *clear*, *durable* and *attractive* decorative or identifying detail, Markem offers you a *complete* answer in screen process equipment and service.

All the items illustrated were marked by Markem screen process machines, available in various models to handle many kinds of cylindrical, oval and flat products, parts, containers, novelties and other items. With these machines, Markem screens and a choice of thousands of specialty inks assure exact registration in multi-color work . . . high opacity, heavy coverage and fine detail . . . consistently high quality reproduction of designs, trademarks, identifying detail. Imprints as large as 10″ x 12″ can be made . . . and marking rates up to 40 objects per minute attained.



For the *right* machine, screen and ink for your particular job — all from one source — plus recommendations based on nearly 50 years of experience in marking and the competent local help of a nearby Markem field engineer, write Markem today. Markem Machine Co., Keene 20, N. H.

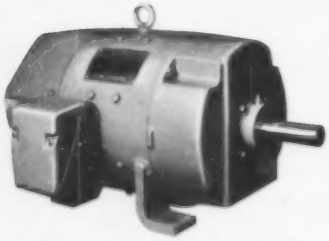
MARKEM

EVERYTHING INDUSTRY NEEDS . . . FOR PROFITABLE MARKING . . . SINCE 1911

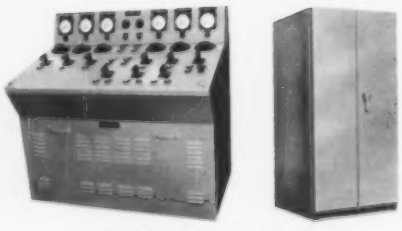
General Electric D-c Drives Help You...

MODERNIZE FOR PROFITS

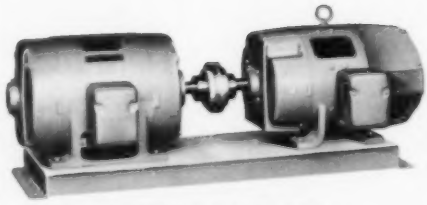
SELECT YOUR DRIVE FROM GENERAL ELECTRIC'S COMPLETE



KINAMATIC DRIVE MOTORS



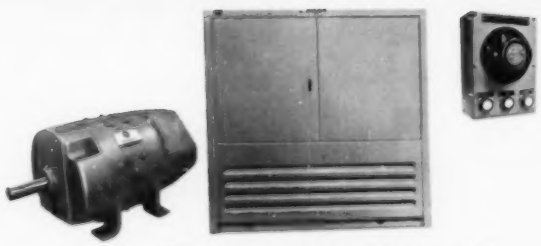
CUSTOM-BUILT CONTROLS



KINAMATIC M-G SETS

You can combat the cost/profit squeeze with a planned program of drive modernization...modernization that provides greater machine flexibility, better quality control, higher output from your calender and extruder. Start your program now. Apply the modern, high performance advantages of General Electric direct-current adjustable-speed drives... drives that provide the fast stops, wide speed range and precision control vital to modern automatic machines. To learn more about the modern capabilities of Kinamatic® motors, Speed Variators and custom-built controls, call your nearby G-E Apparatus Office, or mail the coupon below for a helpful Drive Selection Kit.

LINE OF D-C EQUIPMENT



SPEED VARIATOR PACKAGED DRIVES

To: Section 822-1, General Electric Company, Direct Current Motor and Generator Department, 3001 East Lake Road, Erie, Pennsylvania
Please send me the free General Electric Drive Selection Kit
☐ for extruding ☐ for calendering ☐ also include a free 13 x 29" reproduction of the above painting suitable for framing.

NAME_____

POSITION_____ COMPANY_____

ADDRESS_____

CITY_____ STATE_____

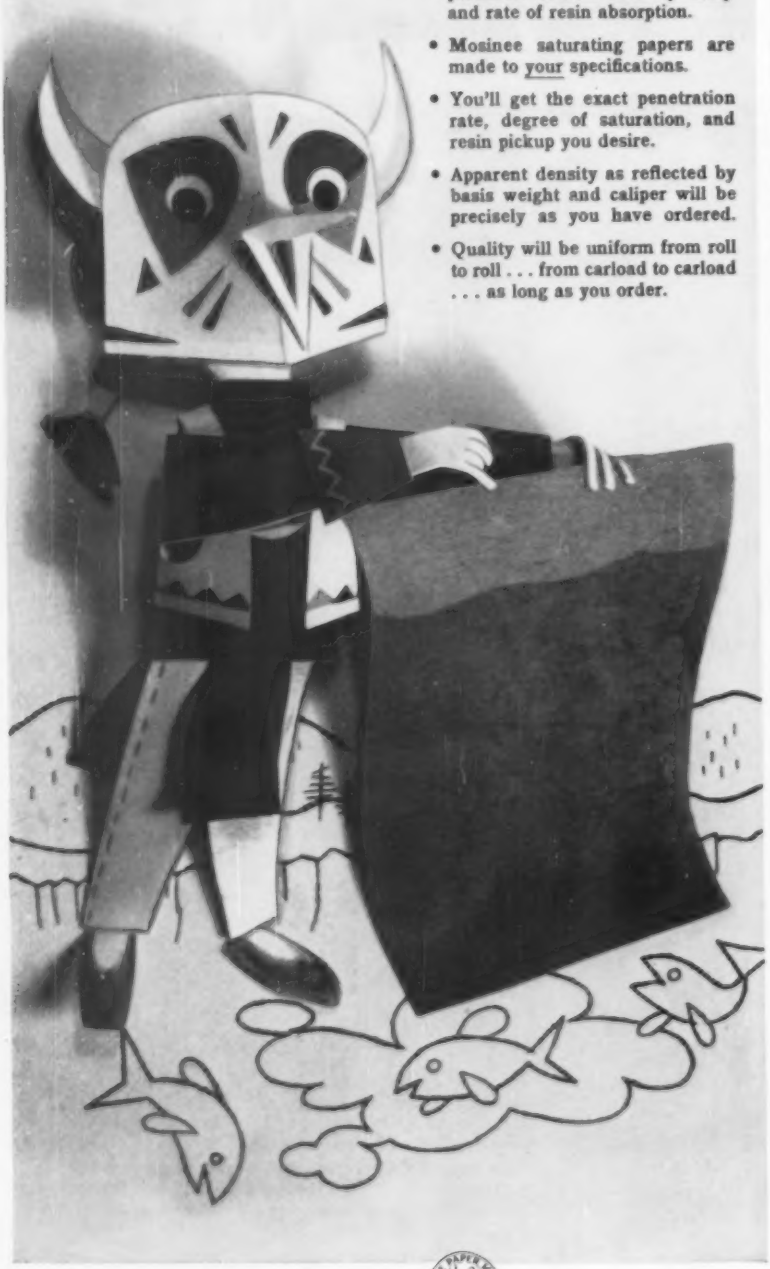
Progress Is Our Most Important Product

GENERAL ELECTRIC

MOSINEE MAKES MAGIC WITH PAPER

For quality laminates... Mosinee Saturating and Impregnating Papers

- These Mosinee papers give you precision control over quantity and rate of resin absorption.
- Mosinee saturating papers are made to your specifications.
- You'll get the exact penetration rate, degree of saturation, and resin pickup you desire.
- Apparent density as reflected by basis weight and caliper will be precisely as you have ordered.
- Quality will be uniform from roll to roll... from carload to carload ... as long as you order.



MOSINEE
PAPER MILLS COMPANY
MOSINEE, WISCONSIN

Write Dept. MP-2.
FREE DATA FILE

the results at least exhibit the proper trend to the extent that it becomes possible to make qualitative comparisons with tensile and compressive data.

Results

The maximum stress for PMMA at 32°F. is given in Fig. 2, p. 138, for compression (4), flexure, and tension (5). The abscissa is the conventional strain rate in the case of the axially loaded specimen; for the bending case, this scale is the strain rate for the outermost fibers of the beam. At low rates, the interrelationship of these curves suggests that the criterion for a flexural failure load is related to the compressive strength of the material. As the rate is increased, the flexural strength becomes intermediate, and at the highest rate approaches the tensile strength of the material involved.

The strength of PMMA at 122°F. (Fig. 3, p. 138), is considerably less for all three types of tests. This decrease may be attributed to the increase of viscous response at the higher temperature. The flexural strength at 122°F. is related to the compressive strength over a much wider range of strain rates.

It may be concluded that the flexural strength of PMMA is rate dependent. Its numerical value may be intermediate to the compressive and tensile strengths, or it may be equal to either, depending upon the strain rate and temperature employed.

References

1. R. E. Ely, "High-Speed Tensile Tests of Thermoplastics," Plastics Tech. *3*, 900 (Nov. 1959).

2. Quarterly Research Review, Ordnance Missile Laboratories Division Report No. 2A19 (Dec. 1958).

3. J. W. Westwater, "Flexure Testing of Plastic Materials," Proc. A.S.T.M. *49*, 1092 (1949).

4. Quarterly Research Review, Ordnance Missile Laboratories Division Report No. 2A17 (June 1958).

5. R. E. Ely, "Tensile Properties for Three Thermoplastics over Six Decades of Rate," Ordnance Missile Laboratories Division Report No. 2R25F (Oct. 1957).—**End**

10 BRIGHT COLORS

for industrial finishes . . . plastics

Exceptionally Heat Stable—Excellent Permanence—Exceedingly Easy to Disperse

THE

HARSHAW

CHEMICAL CO.

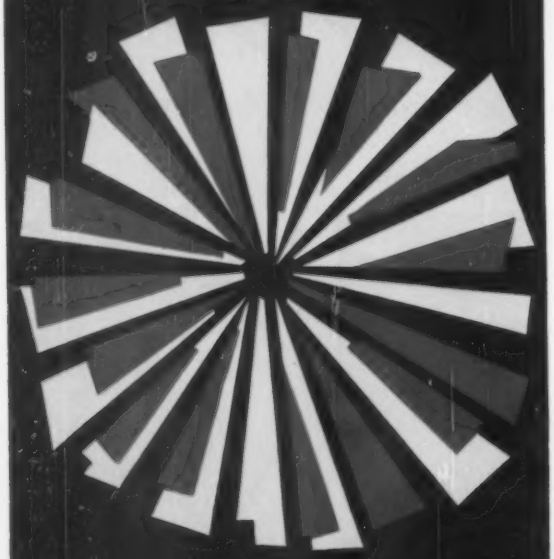
Cleveland 6, Ohio

SAMPLES and COLOR FOLDER showing full range of Yellows and Reds, CP and Lithopone *will be gladly furnished on request*

Chicago
Cincinnati
Cleveland
Detroit
Hastings-on-Hudson
Houston
Los Angeles
Philadelphia
Pittsburgh

HARSHAW

GENERAL COLOR
COMPANY



Manufacturers of Cadmium Yellows and Reds

FOR THE ASKING

Catalog showing 50 standard shades and suggested usage.

The aid of our research department on your special pigment problems is available. Just give us the pertinent details.

GENERAL COLOR COMPANY
Division of H. Kohnstamm & Co., Inc.
24 AVENUE B, NEWARK 5, N. J.

Model 6007
DUAL ZONE
Circulating Unit

Two completely independent systems . . . each with its own heater, pump and controls. Model 6007 accurately will maintain two different temperatures simultaneously.

Sterlco®

High Temperature Control Units

- RANGE FROM 100° to 550° F
- NEED NO SUPERVISION
- ECONOMICAL OPERATION
- EASILY INSTALLED
- ACCURATE • EFFICIENT
- AUTOMATIC
- COMPACT

Model 6016
SINGLE ZONE
Circulating Unit

Provides one temperature range. Where desired, three 6016 units may be mounted on a single base to maintain three separate temperature zones.

These two Sterlco units are designed to maintain extremely high temperatures accurately and safely. Heat transfer fluids are circulated at low pressure! Electric immersion heater of 12 KW capacity, and 10 G.P.M. circulating pump, are standard. However, heaters of 18 KW and 24 KW, and 18 G.P.M. circulating pumps are optional. Provisions for cooling also available.

STERLCO
. . . at your service!

Sterlco field engineers and engineering staff are available to help solve your temperature control problems. Write us today.

Leaders in temperature control since 1916

Sterling inc.
5206 W. Clinton Ave., Milw. 23, Wis.
Industrial Control Division

Pressures on objects

(From pp. 142, 145)

for Poisson's ratio (4), then the equation reduces to:

$$p = \frac{E}{1.16}(K_p - K_G)\,\Delta T$$

The values of E, K_p, and K_G were determined experimentally and the values of pressure that this derivation gave are plotted in Fig. 1 using 190° F. as the point where ΔT is zero. It is found that this value of temperature is somewhat below the heat distortion point of the resin and may, perhaps, be used as another point of physical significance to the nature of the resin. It is seen that the values are within reasonable coincidence and this lends considerable weight to the validity of the hypothesis propounded.

Photoelastic confirmation

It remained then to show that the presence of stresses in a resin around an embedded body was dependent on the coefficients of expansion of that body compared to that of resin for a variety of different materials.

This was done by embedding a number of different materials in Laminac 4116 resin,[3] each of which had a different coefficient of expansion, and examining them under polarized light when the photoelastic effect would reveal any stress in the resin. The materials chosen are shown in Table I, p. 145.

For results, see Fig. 2, p. 145. The coefficient of linear expansion of the polyester is about 55×10^{-6} in./in./°F. It can be seen that the characteristic streaks radiating from the embedded materials are smaller in intensity as the material embedded has a coefficient of linear expansion closer to that of the polyester. It is unfortunate that it was not possible to find a series of materials with coefficients of expansion that run continuously through the range of the polyester.

This observation confirms the hypothesis that the pressure is due to the thermal contraction of the resin around the embedded object and indicates methods that may be employed for relieving this disruptive pressure.

[3]American Cyanamid Co. polyester resin.

Acknowledgments

The authors acknowledge the support of the National Science Foundation and the Research Corporation, and also the generosity of Shell Chemical Corp. and American Cyanamid Co. in providing the resins.

References

1. A. J. Bush, "Shrinkage pressures during cure," Modern Plastics 35, 143 (Feb. 1958).

2. "Resin shrinkage pressures during cure," R. E. Chambers and F. J. McGarry, Proc. 14th Annual Conference, S.P.I. Reinforced Plastics Div. (Feb. 1959).

3. S. Timoshenko, "Strength of Materials," Van Nostrand, New York, 1956.

4. "Plastics for Aircraft, Part II, Reinforced Plastics," ANC-17, June 1955, U.S. Government Printing Office, Washington 25, D.C.—**End**

Compounds for Extrusion and Molding

Alpha Chemical and Plastics Corp.
11 JABEZ STREET, NEWARK 5, N. J.
TEL. MARKET 4-4444

SERVICES:
COMPOUNDING
COLORING
STRAINING
PELLETIZING

LARGE WORK SPACE
Bench Oven 3' x 3' x 3'

Another
GRIEVE-HENDRY STANDARD

Well constructed, efficient Bench Oven with Large Work Space. Especially adaptable to production line work on large units that require heat processing. Work space 36" x 36" x 36". Temperature range to 350° F. 1250 CFM forced air circulation. Stand available. Construction changes to suit needs. No engineering charges. Write for bulletin 2-157.

Specialists in Heat Process Equipment

Quick Quotations
Prompt Delivery
Reasonable Prices
on Ovens Built to Specifications
OTHER STANDARD MODELS — TO 1000° F—
$121.50 AND UP

GRIEVE-HENDRY CO.
1335 N. Elston Ave., Chicago 22, Ill.

THE PLASTISCOPE*

News and interpretations of the news

By R. L. Van Boskirk

Section 2 *(Section 1 starts on p. 39)*

February 1960

Reprocessed PE in pellets

Availability of reprocessed polyethylene film in dense, pellet form has been announced by Interplastics Corp., New York, N. Y. According to Gerald Bamberger, president, the pelleted product represents a 20% savings in raw material cost in comparison with fused type pellets which are currently in use.

Interplastics claims to be the first company to successfully pellet and market this agglomerated PE product on a production basis. Called Poly-pellets, this new product is designed to be mechanically conveyed or screw fed into injection machines, or into extruders.

In addition to supplying reprocessed PE pellets for end users and compounders, the company will produce pellets for other plastic reprocessors who do not have sufficient volume to justify the installation of a complete pelleting system. Custom work will also be carried out for plastics companies who want to evaluate the use of reprocessed PE pellets.

Poly-pellets are produced from segregated film scrap in a cutting and densifying system designed and built by Sprout, Waldron & Co. Inc., Muncy, Pa.

Lincoln Plastics to produce polymer

Plans to market tailor-made polystyrenes for molders of volume items requiring special characteristics, as well as a line of general-purpose molding powders, have been made by Lincoln Plastics Corp., Stamford, Conn. This manufacturer of plastics wall tile and other products in both crystal and high-impact polystyrene has installed a basic polymerization unit to produce the raw material in accordance with its own needs. In the new installation, the liquid monomer is pumped to the fifth floor of the plant and metered into the polymerization area. A carefully controlled time and temperature cycle completes the conversion to polystyrene. The product is then gravity fed to a series of extruders and grinders which produce the desired mesh size. A positive pressure pneumatic system, supplied by Sprout, Waldron & Co., takes the material to three outside storage tanks each having a capacity of 50,000 pounds. Here the material is held until needed for further plant use.

Vinyl for furniture

One of the reasons why vinyl production reached a new high in 1959 is that sales of household furniture reached a new record during that year. According to John M. Snow, executive vice-president of the National Association of Furniture Manufacturers, shipments last year totalled $2.6 billion—an increase of about 13% over 1958. He forecast that another 10% increase can be expected for 1960. The anticipated increase in population and the disproportionate expansion of the marriage-age group, multiplying the need for household furniture up to 2 million homes annually during the next decade, may result in shipments up to $4.35 billion by 1970, an increase of over 55% over the 1959 total.

Until now, the main uses for vinyl furniture coverings has been in the kitchen and dinette areas, with only 2% of the coverings used for living room suites, according to the Bolta Products Div. of The General Tire & Rubber Co.

To improve vinyl's position in the living room, Bolta has now launched an extensive promotion program. The campaign centers around the coordination of Boltaflex vinyls in various colors, textures, and patterns, with various fabrics to cover sofas and armchairs. By helping furniture manufacturers and designers to use the two materials side-by-side, Bolta expects vinyls to capture 30% of the living room furniture upholstery market.

Stabilized bronze for vinyl

Causes of burnout, tarnishing, and greening of vinyl products pigmented with bronze gold colorants are claimed to have been pinpointed by Claremont Pigment Dispersion Corp., Roslyn Heights, N. Y. According to a recent technical bulletin issued by the company, manufacturers working with "D" and "Q" series bronze gold colorants can produce extruded or calendered compounds of excellent stability.

Claremont also has a K-7500 series of gold bronze and copper pastes which are suggested for plastisols and organosols with resultant coatings that are said to heat cure with no color change and are claimed to be color permanent and free from tarnishing in outdoor tests. They are useful in such applications as plastisol-coated housewares, vinyl-metal laminates, and automotive upholstery materials.

Flame retardant receptacles

A line of materials handling receptacles made from Pyronil, a flame retardant grade of vulcanized fiber, has been introduced by National Vulcanized Fibre Co., Wilmington, Del. The line includes trays, pans, bins, boxes, floor trucks, baskets, and containers for plants where exposure to fire is a potential hazard, or where safety programs require flame resistant materials.

Aids blind hole tapping

A new formula wax pellet tap cartridge especially notched for the plastics industry is said to eliminate chip **(To page 208)**

* Reg. U.S. Pat. Off.

NOW: The positive solution to stubborn release problems...

Precision-controlled Daubert Release Papers

Individualized to fit your specific needs

From whisk-away ease of release to a gentle or moderate "bite", the new Daubert papers can be *individualized* to provide the exact level of release-ability needed for easier handling, more efficient production or utilization of your products.

Equally important, precision-control of manufacture assures you of consistent, uniform quality and performance with Daubert papers . . . shipment after shipment.

A wide choice of base stocks—super calendered sulfites and krafts, parchmentized and clay-coated krafts, and foils—will provide just the right strength, weight, flexibility *and* finish you desire in a release sheet.

Requests for free technical assistance and samples invited.

Where opposing sides of a sheet must perform different functions, Daubert chemists will tailor each side to achieve the optimum release and type of finish. *(Dials illustrate relative resistance to separation of product and release sheet.)*

Daubert release papers have proved outstanding in these applications: • Film casting • Foamed products • Rubber curing • Tapes • Pressure-sensitive labels, decals, decorative plastics, nameplates, wallpapers

DAUBERT CHEMICAL COMPANY

Our Twenty-Fifth Year 25

4700 S. Central Avenue • Chicago 38, Illinois • Telephone LUdlow 2-1000

DISTRIBUTORS IN PRINCIPAL CITIES

THE PLASTISCOPE

(*From page 206*)

problems in blind hole tapping operations. The cartridge, manufactured by Tap Cartridge Co., Cincinnati, Ohio, is dropped into the drilled, or drilled and reamed hole, and as the tap works its way into the hole, a solid flow of wax carries the chips along and out of the flutes as fast as the chips are made. The last chips are withdrawn with the tap.

The new cartridge is said to eliminate chip removal operations, reduce rejects due to torn threads, and overcome tapered or over-sized threaded holes. Tap cartridges are available in sizes 0.80 to 1.25 inches.

Cyclohexane plant

Gulf Oil Corp. has completed a new multi-million dollar high-purity cyclohexane plant at its Port Arthur, Texas refinery. Initial production is scheduled for this month. The material is one of the basic ingredients in the manufacture of nylon. Cyclohexane is also used as a solvent in the manufacture of polyethylene and as a raw material for plasticizers and synthetic lubricants.

The benzene used as a raw material for this plant will be supplied from a large facility which was brought on stream by Gulf in June 1959.

Compounds for PP catalysts

Commercial production of vanadium chlorides, which are used in the preparation of stereospecific catalysts for the polymerization of polypropylene, has begun at the new Weston, Mich. unit of Anderson Chemical Co., Division of Stauffer Chemical Co.

Output of the plant will be sold primarily as intermediates for the manufacture of catalysts.

Polyethylene exports

Considerable interest has been aroused in industry by the large amount of polyethylene material exported from the United States to foreign countries. (See table at right.) It amounted to around 30% of the polyethylene resin produced in the United States each year. There are no other plastics exported in such large volume or percentage. A notable feature is that Japan is the largest importer by far with a total of around 64 million lb. in 1959—the next largest is Belgium with around 28 million pounds. The question in the minds of industry members is: How long will this pattern be maintained since foreign capacity for high-pressure resin alone has now been built up to more than 800 million pounds. A good portion of this capacity is operated by affiliates of American firms. Japan, the largest importer, has a present capacity of around 155 million lb. under construction or in operation and plans to have 250 million by **(To page 210)**

Export of U.S.-produced polyethylene

Country	*1958*	*1959**
North America		
Canada	21,280,031	17,680,000
Mexico	8,667,443	8,740,000
Others	1,334 533	2,525,000
Total	**31,282,007**	**28,945,000**
South America		
Argentina	6,020,400	3,910,000
Brazil	4,380,630	3,080,000
Ecuador		3,460,000
Venezuela		1,740,000
Colombia		2,365,000
Others	6,024,059	2,090,000
Total	**16,425,089**	**16,645,000**
European Common Market		
Belgium	25,420,095	27,515,000
France	20,183,222	8,885,000
West Germany	18,973,421	23,650,000
Netherlands	14,634,617	12,360,000
Italy	7,124,564	24,305,000
Total	**86,335,919**	**96,715,000**
Europe (Excl. USSR & ECM)		
Sweden	10,433,693	9,905,000
United Kingdom	9,657,148	19,115,000
Denmark	7,538,353	7,255,000
Switzerland	6,578,249	10,050,000
Norway	3,276,560	3,080,000
Austria	3,087,186	3,725,000
Finland		1,870,000
Portugal		1,725,000
Others	5,452,572	2,635,000
Total	**46,023,761**	**59,360,000**
Asia & Australia		
India	2,203,250	3,295,000
Phil. Rep.		1,780,000
Korean Rep.		3,070,000
Hong Kong	5,349,160	11,770,000
Japan	39,297,541	63,920,000
Australia & New Zealand	3,262,888	1,645,000
Others	4,770,582	5,140,000
Total	**54,883,421**	**90,620,000**
Africa		
Union of South Africa	5,309,117	6,825,000
Others	855,553	695,000
Total	**6,164,670**	**7,520,000**
GRAND TOTAL	**241,114,867**	**299,805,000**

* Last 4 months prorated since export figures were not yet available.

from Monsanto Polyethylene 706

packaging films that always "test best" in heat sealability!

The heat seal test is one of the many film tests made to assure dependable performance from packaging films extruded from Monsanto Polyethylene 706 resin. Film samples extruded from tough 706 are regularly tested on this heat sealer instrumented for pressure, temperature and dwell time. Seals are then evaluated for strength and consistency.

Monsanto Polyethylene 706 was specifically developed for industrial packaging films. 706 is an extremely uniform resin—blend to blend, bag to bag—assuring outstanding consistency in both extrusion and converting. The film produced has top notch heat sealability, great impact strength, excellent openability in all gauges and at all filling speeds, uniform translucency. No wonder more and more converters are depending on film of 706 for trouble-free operation in hundreds of industrial film applications.

Work with the film that "tests best"—write for names of extruders of 706 resin. Monsanto Chemical Company, Plastics Division, Room 626, Springfield 2, Massachusetts.

Monsanto®

THE PLASTISCOPE

(*From page 208*)

the end of 1962. Present capacity in Japan is estimated at about 80 million lb. high-pressure and 75 million low-pressure material.

Nylon tubing

Continuous lengths of nylon pressure tubing in a wide variety of diameters and wall thicknesses are now being offered on an off-the-shelf basis by U. S. Gasket Co., Plastics Div. of The Garlock Packing Co., Palmyra, N. Y. The tubing finds applications in high-pressure fluid and pneumatic service, and in other applications where friction is a problem and lubrication impossible or impractical. The material is shipped in reel form.

Russians study U.S. plastics

A six-man delegation of Russian plastics, building, and economics experts toured the United States between Nov. 17 and Dec. 8, 1959 under joint sponsorship of the U. S. Department of State and Omni Products Corp., New York, N. Y. Subject of their interest was "Applications of Plastics in the Building Industry." Leader of the delegation was A. G. Zaitlev, director of the Institute of Building Materials, Moscow.

Plastics building product plants visited were those of American Biltrite Corp., Trenton, N. J. (floor and wall tile), Congoleum-Nairn Inc., Kearny, N. J. (vinyl floorings), Kalwall Corp., Manchester, N. H. (plastics sandwich constructions), Wasco Production Corp., Sanford, Me. (decorative acrylic sheets and panels), Pioneer Plastics Corp., Sanford, Me. (decorative melamine laminates), C. F. Church Co., Monson, Mass. (styrene wall tile, toilet seats), Maynard Plastics Inc., Columbus, Ohio (pipe, fittings), Columbus Plastics Products Inc., Columbus, Ohio (molded household products), Molded Fiber Glass Co., Ashtabula, Ohio (reinforced plastics auto bodies, boats, and panels), St. Regis Paper Co. Panelyte Div., Kalamazoo, Mich. (decorative laminates), Filon Plastics Corp., Hawthorne, Calif. (continuous process for translucent reinforced plastics panels), and Lincoln Plastics Corp., Stamford, Conn. (wall tiles).

In addition the delegation visited the conference of the Building Research Institute in Washington, D. C., the laboratories of DeBell & Richardson Inc., Hazardville, Conn., and the School of Architecture at M.I.T.

Laminated film products

A movie on film and foil laminations and polyethylene extrusions has been completed by Milprint Inc., Milwaukee, Wis. The film shows the purpose behind different laminations and views the workings of a lamination and a PE extruding machine in action. It includes information on how to select the proper material, how to choose the proper laminant, and other topics.

Milprint is now shaping plans to show the new movie in Chicago, Ill., prior to its general release to the industry.

Seek tests for laminates

An insulation research project directed toward developing a reproducible test method for measuring insulating resistance of high-pressure laminates used for electrical circuits or for printed circuitry in aircraft, missile, and electronic applications is being undertaken at the University of Delaware. Prof. M. G. Young, chairman of the University's Dept. of Electrical Engineering, will direct the work. Factors to be studied will include accuracy and constancy of temperature and humidity control.

Texas company issues stock

The Whitehouse Plastics Corp., Fort Worth, Texas, has received permission from the U. S. Securities & Exchange Commission and the Securities Commission of the State of Texas to issue 300,000 shares of stock at $1.00 per share. Upon the sale of these shares, the company will have 2,500,000 shares outstanding.

Affiliated with Whitehouse Plastics is the Whitehouse Boat Co., Fort Worth, a division, and North American Mfg. Corp., Warsaw, Ind., a wholly-owned subsidiary which was purchased recently. Another wholly-owned subsidiary, Whitehouse Chemical Co., Fort Worth, is geared to a production capacity of 30 million lb. of polyester resin annually.

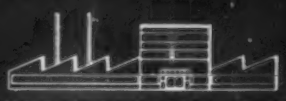
Plastics shows in Europe

Several European countries are sponsoring plastics shows this year to draw attention to progress in their own industry and to provide an international showcase for plastics.

The Norwegian Plastics Federation has organized an International Plastics Exhibition to be held at Festningsplassen at Akershus, Oslo, from May 20-31. A convention **(To page 212)**

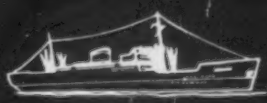
MAYNARD AXELROD (far left), general manager of Maynard Plastics Inc., and Tino Perutz, (second from left), president of Omni Products Co., explain operation of new Essex tube extruder to A. G. Zaitlev, leader of a recent Soviet technical delegation. Group toured U. S. studying application of plastics in building industry.

SUPPLIERS OF RAW MATERIALS
TO THE PLASTICS INDUSTRY



INTERPLASTICS
MAKES:

Polyethylene compounds:
Colors, Density, Melt Index to customer's specification
Special Effect molding powders:
Mother-of-pearl, phosphorescents, tinsels
Polystyrene, All colors, Including Utility Black
General Purpose and High Impact



INTERPLASTICS
EXPORTS:

Polyethylene
Polystyrene
Cellulose Acetate
Other thermoplastic molding powders and raw materials, Virgin, Substandard and Scrap
Dry Colorants

INTERPLASTICS
BUYS:

Plastics Scrap
Surplus Molding Powder
Off-specification Resins and Compounds

INTERPLASTICS
DISTRIBUTES

Polyethylene
Polystyrene
High Impact Polystyrene
Vinyl Resins
Vinyl Compounds for injection molding and extrusion

INTERPLASTICS
CORPORATION

120 EAST 56th STREET, N.Y. 22, N.Y., U.S.A.
TEL: PLAZA 1-4280 CABLE ADDRESS: INPLAKO

THE PLASTISCOPE

(*From page 210*)

will be held at the same time where papers will be read on subjects of current interest in the general field of plastics. Further information can be obtained from Norges Varemesse, Borsen, Oslo, Norway.

Belgium, at the center of the European Common Market, is holding a trade fair of a broadly based European character. Called Europlastica 60, the exhibition will be held in Ghent from June 18-26. Additional information may be obtained from Europlastics exhibition, called macroFloralies, Ghent, Belgium.

The second Dutch international plastics exhibition, called macroPlastic, will be held in Utrecht, Holland, from October 19-26. The exhibition area comprises 290,000 sq. ft., and the show will be twice as large as the 1957 exhibition in Amsterdam. Apart from company exhibits, the show will feature displays designed to provide instruction in the application of plastics products in various industries. Another section will be devoted to the display of experimental applications for plastics. Further information can be obtained from macroPlastic Internationale Kunststoffenbeurs, Tesselschadestraat 5, Amsterdam, Holland.

The Society of Plastics Engineers is organizing special group flights to the Belgian and Dutch exhibitions. Full details can be obtained from Dr. Heinz Neunteufel, 116-16 Audley St., Kew Gardens 18, Long Island, N. Y.

The next major show in the United States is the 9th National Plastics Exposition sponsored by The Society of the Plastics Industry Inc., which will be held at the Coliseum, New York, N. Y. June 5-9, 1961.

New use for acrylic

A wraparound boat windshield made of acrylic, mounted on the motorwell of a runabout, sportster, or cruiser acts as a baffle while glamorizing the appearance of the outboard motors. The do-it-yourself installation, developed by Arthur L. Hoffman, a Wisconsin boatman, is said to cut motor noise about 50% and deflects most of the exhaust fumes when motors are idling. Mr. Hoffman used a Surf-Queen windshield manufactured by Cadillac Plastic and Chemical Co., Marine Div., and if enough public interest is generated by this new application, the company may offer boatwell mounting frames as part of its spring line.

Epoxy molding compounds

Single-component epoxy molding compounds for mass production of computer and missile components have been developed by American-Marietta Co., Adhesives, Resin & Chemical Div., Seattle, Wash. Known as EMC, the compounds are said to be easy to handle, suitable for low-pressure transfer and compression molding. They are also said to be non-outgassing, self-extinguishing, and self-releasing.

Current uses are reported to range from miniature electronic parts smaller than paper clips to large electrical transformers. The company is also working to develop consumer product applications for these materials.

Film for paper products

An overwrap of chill-roll cast PE film is used by Hallmark, major manufacturer of greeting cards and related items. Currently, the company has two applications—gift papers and a package of 12 Valentine cards. Both involve **(To page 214)**

Celebrates fifty years in plastics

Arnold E. Pitcher, retired since 1949 as general manager of the Plastics Department (now Polychemicals Dept.) of E. I. Du Pont de Nemours & Co., has just celebrated fifty years in plastics—a noteworthy event in an industry as young as ours.

On January 1, 1910, he joined the Arlington Co., early manufacturer of pyroxylin plastics, as a salesman in Ohio and Indiana, and from 1914 to 1920 was district sales manager in Chicago.

Du Pont acquired the Arlington Co. in 1915. Five years later Mr. Pitcher was appointed assistant director of sales in the Pyralin Div. of Du Pont's Sales Dept., and in 1922 director of sales. When Du Pont bought the Viscoloid Co. in 1925 and formed the Du Pont Viscoloid Co., Mr. Pitcher was made director of sheeting sales.

Appointed a vice-president and then executive vice-president in 1929, he was made president and a member of the Board of Directors in 1932. He was made president of the Celastic Corp. in 1932, a subsidiary jointly owned by Du Pont and the United Shoe Machinery Corp. When the Du Pont Viscoloid Co. was dissolved and the Plastics Dept. formed in 1936, he was appointed to his post as general manager.

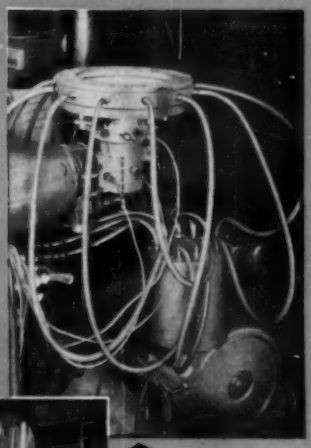
Under Mr. Pitcher's leadership the Du Pont Co. developed and marketed many new plastics, including Lucite acrylic resin, Butacite polyvinyl acetal resin, Teflon, Zytel nylon, polyethylene. His service record spanned the years from celluloid combs and collars to squeeze bottles, printed circuits, and plastics boats.

To Arnold Pitcher our congratulations and those of our industries on the celebration of fifty years in the plastics industry.

For highest quality blown film, or cast film by the chill-roll method

Blown (or tubular) film die head with a 30" opening diameter for extrusion of maximum 10 foot lay-flat tubing (20 foot sheeting)

Packaged Film Extrusion Unit with extra-long extruder, die accessories and takeoff tower.



The use of our engineered cooling rings and air compressors results in higher quality film and increased out-put speed.

.... extrude it on a Reifenhäuser!

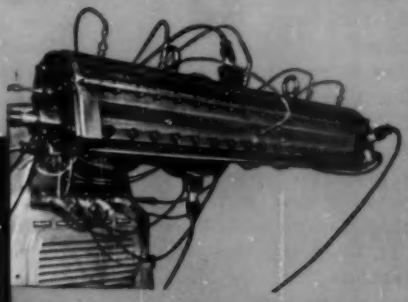
Film Take-Off Tower Features two wind-up stations with automatic tension control. Note adjustable slitters for sheeting.

In addition to our line of extruders (1-1/4", 1-3/4", 2-1/2", 3-1/2" and 6" screw diameter) Reifenhäuser furnishes complete and automatic "package units" for every type of thermoplastic extrusion.

Yes, Reifenhäuser Extrusion Equipment enjoys a world-wide reputation for its superior engineering features, its dependability in extruding difficult materials, and its efficiency in operation.

Keep in step with progress by writing us today for full information on the new Reifenhäuser Extruder.

Casting Machine for extrusion of flat film by the chill-roll method. Available in a 31" and 63" roll width incl. double wind-up.



Flat Film Die Heads are available for film up to 63" and wider.

Reifenhäuser KG

MASCHINENFABRIK

Troisdorf, West. Germany

Representative for sales and service in USA:

H. H. HEINRICH CO.

111 Eighth Avenue, NEW YORK 11, N. Y.

THE PLASTISCOPE

(*From page 212*)

materials which, because they are packaged several months in advance, require a combination of excellent shelf life and clarity from the overwrap material. According to Spencer Chemical Co., Poly-Eth 2756, a 0.928 density resin, chill-roll cast by Flex-O-Glass Inc., Chicago, Ill., is being used.

DAP laminate for furniture

A decorative laminate based on diallyl phthalate resin, which can be easily and economically applied to almost any core material, made its debut during the January International Home Furnishings Market in Chicago, Ill. Developed by Food Machinery & Chemical Corp., the new Daponite decorative laminates utilize the corporation's Dapon diallyl phthalate resin.

Among the companies currently using Daponite finishes on their product lines are Arlington Seating Co., Thonet Industries Inc., Sauder Mfg. Co., Roddis Plywood Co., Trimont Plastics, Sico Mfg. Co., and Wilcox-Woolford Corp.

The diallyl phthalate based finish is said to be hard and resistant to wear and abrasion.

In the furniture and decorative laminate field, the basic resin, in the form of a dry, free-flowing powder, is supplied to impregnators who coat special paper with the dissolved material by roller or dip coating. The saturated paper, which can be clear or patterned with any number of decorative effects, is then applied to the plywood, hardboard, chipboard, or other flat, smooth surfaces. When heated in a press under moderate pressure, the resin softens and flows into the surface of the board where it advances to a fully cured resin.

According to FMC, Daponite can be applied with presses exerting only 100 to 250 p.s.i., permitting use of a greater variety of less costly core materials.

Daponite impregnated paper can be rolled up and presents no handling problems. Since the resin becomes an integral part of the wood, rather than being bonded to it in an intermediate laminating operation, the solid dark line found at the edge of some other plastic laminates is eliminated.

In the $400 million laminate market, FMC claims its new material will find outlets in decorative table tops, vertical wall panels, cabinets, and various types of built-ins. Property claims made by the manufacturer state that the material is resistant to stains, solvents and cleaners; unaffected by chlorine bleaches, nail polish, dye; resistant to fire and cigarette burns; and unharmed by boiling water, hot pots and pans.

Almost all of the Daponite laminating material is supplied to furniture manufacturers and panel laminators as impregnated papers of various kinds. FMC currently supplies Daponite to custom saturators such as U. S. Polymeric Chemicals Inc., Stamford, Conn.; Riverside Laboratories, Geneva, Ill.; and Fabricon Products, Div. of Eagle Picher Co., River Rouge, Mich.

FMC has recently organized sales, technical service and laboratory staffs to market Daponite laminating resins and to help solve problems of its customers and users. The sales staff is headquartered in New York, N. Y., while the laboratory and research personnel are in Baltimore, Md., and Princeton, N. J.

Insulating materials division organized

The National Electrical Manufacturers Association (NEMA) has organized an insulating materials division to represent the nation's leading manufacturers of electrical glass insulation, laminated products, manufactured electrical mica, varnished fabric and paper, varnished tubing and saturated sleeving, and vulcanized fiber.

E. R. Perry, president, National Vulcanized Fibre Co., has been elected chairman of the division's board and as such becomes a vice-president of NEMA and a member of the association's officers committee. D. J. O'Conor Jr., president and general manager, Formica Corp., has been elected first vice-chairman, and R. L. Westbee, vice-president, Irvington Div., Minnesota Mining & Mfg. Co., has been named second vice-chairman. The division plans to hold its first convention in June at the Homestead, Hot Springs, Va.

Heating cylinders for rent

Standard and vented-reverse-flow-design heating cylinders for many of the most popular makes of injection molding machines can now be rented from Injection Molders Supply Co., 3514 Lee Rd., Cleveland, Ohio. For many models, the company is able to supply heating cylinders from stock.

New spray gun polyester

Announced by Naugatuck Chemical Div., U. S. Rubber Co., is a new polyester resin and catalyst system especially designed for resin spray guns. It is Vibrin 158 A, and has reportedly been field tested in boat building.

Claims for the resin are: good glass wetting, a specific gravity of 1.045, a maximum exotherm of 176° F., shrinkage of 7.5%, water absorption (cured) of 0.20%, and a heat distortion point (cured) of 194° F., according to Naugatuck.

Fibrous glass laminates made with this resin are reported to have higher tensile impact and compressive strength than laminates made with conventional resins.

Elecrical uses for PE

A wide range of UL approved high-voltage electrical connectors and tube cap connectors are now being made available by Alden Products Co., Brockton, Mass., in W. R. Grace's flame-retardant Grex high-density polyethylene. The connectors are said to resist fire from arcing that frequently occurs in high-voltage use.

PE for dairy waxes

At a recent demonstration by Semet-Solvay Petrochemical Div., Allied Chemical Corp., dairy wax containing 1½% A-C polyethylene 6 stored for 16 hours at 150° F. showed no settling—as compared to 50 to 70% separation in waxes formulated with conventional polyethylenes, according to the company. Poly- **(To page 216)**

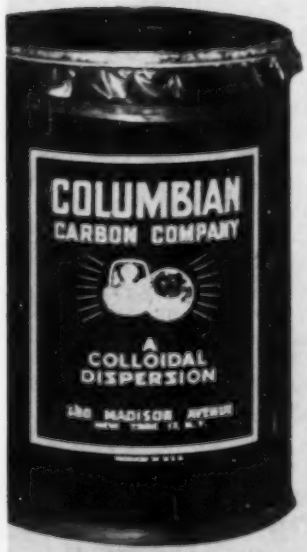
COVINYLBLAK®...a dispersion of carbon black in vinyl resin—chip form.

COSTYRENEBLAK®...high quality colloidal dispersions of carbon black in polystyrene resin—concentrated granular form.

COLUMBIAN...

outstanding carbon black dispersions for plastics

every step of the way!



COPEENBLAK®...a colloidal dispersion of carbon black in polyethylene resin—concentrated form.

AQUABLAKS®...water dispersions of carbon black for integral dyeing of synthetic fibers.

COWAXBLAK®...a colloidal dispersion of carbon black in chlorinated paraffin—chip form.

Whatever your need in the plastics industry ...Columbian's predispersed carbon blacks will meet your most exacting requirements efficiently and economically...provide unsurpassed quality...and profit!

COLUMBIAN CARBON COMPANY
380 Madison Avenue, New York 17, N. Y.

THE PLASTISCOPE

(From page 214)

ethylene now widely used in premium dairy waxes gives cartons a smooth, even finish with a plastic-like feel. In addition, cartons are said to resist bulging and leaking and to be better able to withstand rough handling, thus increasing shelf life. PE blends improve coverage, and are said to minimize wax consumption.

Plastics pipe

Illinois approves. The use of plastics pipe and fittings for house or building service connections, for drainage and vent piping within the building, and in cold water piping systems outside the building walls has been approved by the State of Illinois. The state's new plumbing code specifies that plastics pipe and fittings, plastics cement, and pipe-thread lubricants for rigid plastics pipe shall be approved by the National Sanitation Foundation and carry the NSF Seal of Approval on the pipe. A table of dimensions and tolerances for rigid PVC or semi-rigid PE pipe is also included in the code. Copies of the Illinois State Plumbing Code can be obtained by writing to Illinois State Department of Public Health, Springfield, Ill.

California, Kentucky, Maine and Wisconsin have also previously approved the use of plastics pipe for various water services.

PVC irrigation system. A new 18-hole golf course and driving range near Lake Tahoe, Calif., uses an irrigation system where all branch lines are made of plastics pipe and plastics fittings. About 12,000 ft. of Koroseal rigid PVC pipe and 1000 PVC fittings will extend over more than 50 acres with a ground level rise of about 80 feet. Trenches in the golf course installation need not be straight because the pipe can be "snaked" to follow irregular lines caused by roots, rocks, or other obstructions.

The standard 20-ft. lengths of 1¼ and 2-in. pipe used in this installation are identified as Grade 300 high impact, manufactured by B. F. Goodrich Industrial Products Co., a division of B. F. Goodrich Chemical Co., Akron, Ohio.

For gas services. Home connection lines for natural gas distribution services, containing some 10,000 ft. of rigid vinyl pipe have been installed in Decatur, Ill., by the Illinois Power Co. The system uses ¾ in. pipe produced by the Kraloy Plastic Pipe Co., Los Angeles, Calif. Designated DM grade, it is a medium wall pipe made from Geon vinyl resin, a product of B. F. Goodrich Chemical Co.

Potable water systems. The U. S. Marine Corps has ordered 135,000 ft. of 2-in. and 33,750 ft. of ¾-in. Schedule 120 rigid PVC pipe to be used in potable water systems in Marine Corps field installations throughout the world. The pipe is supplied by Alpha Plastics Inc., Livingston, N. J.

Ice rink tubing. Polyethylene tubing especially designed for ice rinks has been developed by the National Tube Div., U. S. Steel Corp. According to the company, the new tubing, using Hi-Fax high density polyethylene supplied by Hercules Powder Co., Wilmington, Del., contracts only 7 in. over a 185 ft. length, as the refrigerant it carries drops to around 20° F.

The tubing is produced in 185-ft. coils—which is standard rink size—weighing 13 pounds. The long lengths eliminate the need for joints, and the only connections required are two header pipes at one end of the rink, and two return bends at the other.

National produces the tubing in a nominal 1-in. size. Minimum burst pressure is listed at 370 p.s.i. at 20°, 245 p.s.i. at 75°, and 190 p.s.i. at 100° F.

Electrical conduit. Underground electrical installations serving three new buildings on the campus of the University of West Virginia use approximately 30,000 ft. of 5-in. high impact polystyrene conduit, produced by Franklin Plastics Inc., Franklin, Pa. Joints are made with solvent cement. Weighing about ⅛th that of a metal conduit, Dur-X was handled in 30-ft. lengths instead of conventional 10-ft. sections, thus eliminating two-thirds of the joints normally required, and also cutting installation time in half.

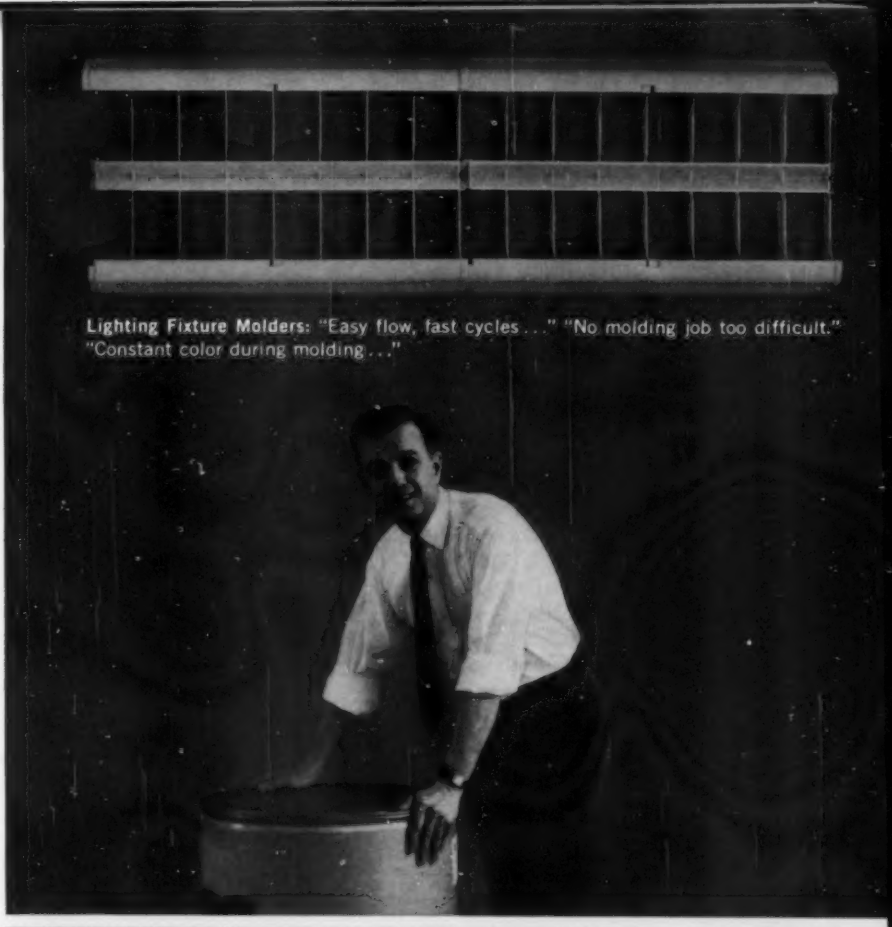
RP couplings. Fibrous glass reinforced epoxy insulating couplings have been introduced by Ed Conley Plastic Corp., Tulsa, Okla. Their heavy-walled laminated structure is said to permit pipe wrench installation. Operating temperatures up to 300° F. are said to be feasible if non-shock pressures do not exceed 100 p.s.i. These couplings are available from stock in standard iron pipe threads of 1, 2, 2½, 3, and 4 inches. Special sizes can be made to order.

Sealing tape. An unfused film tape made with a Teflon resin, designed to seal and permanently lubricate threaded and coupled pipe joints, has been introduced by Minnesota Mining & Mfg. Co., Irvington Division. Called Scotchrap Dry Thread Sealer No. 4212, the tape can be applied in seconds, and conforms to all types of pipe threads and fittings in any pipe system up to 1000 p.s.i., according to 3M. It is said to be able to withstand processing temperatures from the liquid-oxygen range through that of superheated steam. Although non-adhesive, the tape is sufficiently cohesive to stick to its own glossy surface, as well as to any pipe thread. It also eliminates the need for brushing dope solutions on pipe fittings, and can be applied by one person. Available in 260 or 520-in. lengths, ½ in. wide.

PVC resists abrasion. A growing use of polyvinyl chloride pipe in South America involves transporting coffee beans as a slurry to processing areas where they are cleaned, dried, and packed.

The abrasion resistance of PVC pipe supplied by A. M. Byers Co., Pittsburgh, Pa., is superior to galvanized steel previously used. External corrosion **(To page 218)**

WHAT THEY'RE SAYING ABOUT LUSTREX® PERMA TONE STYRENE



Lighting Fixture Molders: "Easy flow, fast cycles . . ." "No molding job too difficult." "Constant color during molding . . ."

Lighting Fixture Manufacturers: "2 to 3 times more resistant to yellowing . . ." "Exceeds IES–NEMA–SPI specs for light stabilized styrene." "Excellent crystal clarity . . . unlimited color possibilities."

To all the inherent advantages of styrene in lighting—the large areas of illumination, the light weight, good diffusion, unusual design effects—perma tone adds excellent light stability, a resistance to yellowing up to three times better than regular styrenes. Proven in use by leading fixture manufacturers, without formulation changes since 1956, perma tone opens up wide new dimensions in color, including truly translucent whites and other difficult colors.

Lustrex perma tone styrene is available for injection molding or extrusion. Write for complete technical data to Monsanto Chemical Company, Plastics Division, Room 663, Springfield 2, Massachusetts.

Monsanto

THE PLASTISCOPE

(*From page 216*)

problems were also overcome more easily by the rigid plastics pipe, the company reports.

Foams

Polystyrene foam approved. A specification for expanded polystyrene for thermal insulation has been approved by the manufacturers of the material and copies are available from Arthur L. Faubel, acting secretary of the Expanded Polystyrene Manufacturers Task Force, Room 736, 342 Madison Ave., New York 17, N. Y.

The new specification covers both types of expanded polystyrene for thermal insulation—molded (Type 1) and extruded (Type 2). Both types included plain and self-extinguishing polystyrene material.

Potting with urethane foam. A departure from the conventional method of potting complex electric units in foamed resin has been developed for the Canadian government by F. B. Fisher and J. S. Gurney of Canadian Westinghouse Co. Ltd. The new method is said to completely fill the interstices between the component parts.

The conventional method of potting electronic units with foam resins consists of pouring the viscous fluid resin into the cavity and allowing it to expand to fill the space. In complex units in which there may be only a small opening through which the resin can be poured, it is difficult to avoid pockets of entrapped air.

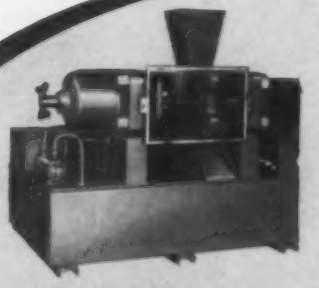
The new development involves the use of a finely powdered resin obtained by freezing a partially reacted foam resin to a brittle state, then grinding it to a fine powder. The powder is poured into the cavity to be filled, shaken into the smaller cavities, and as a final step the unit is heated to cause foaming to occur.

In the Canadian development, a urethane foam resin formed by reacting a glycerol phthalate adipate maleate resin and a diisocyanate, such as metatolylene diisocyanate, was used.

Flexible polystyrene. A new type of internal cushion packaging material that is said to have one of the highest energy absorption per dollar values has been developed by Armstrong Cork Co., Lancaster, Pa. Called Resilo-Pak, it is a highly resilient polystyrene foam made from expandable beads in three grades to meet a range of cushioning requirements. Resilo-Pak reportedly retains its physical characteristics from −85 to 175° F.; is dimensionally stable at normal temperatures; has a neutral pH; is non-abrasive; non-dusting; and non-hygroscopic. It can be die-cut to form a variety of cushioning or positioning shapes that previously had to be molded, the company reports.

The material includes densities of 0.5, 0.75, and 1.0 lb./cu. ft., but Armstrong emphasizes that its Resilo-Pak 200, 300, and 400 distinguish each other in cushioning properties **(To page 220)**

..... In Logan You DO Get Improved Design



HYDRAULIC PREFORMERS

They may be used for handling the entire range of materials from G.P. phenolics to higher impacts that are rag filled. Capacity range: 30 to 125 tons.

HYDRAULIC PRESSES

For semi-automatic and automatic compression and transfer molding of plastics and rubber. Custom designed presses for special applications. Capacity: 10 to 400 tons.

FREE PRODUCTION ANALYSIS. Without obligation Logan Engineers will analyze your costs to see if they can be reduced.

WRITE FOR NEW CATALOG

LOGAN HYDRAULICS, INC.

4901 W. LAWRENCE AVENUE • CHICAGO 30, ILLINOIS

Introducing **EPOXOL 7-4** *. . . by Swift*

THE HIGH OXIRANE STABILIZING PLASTICIZER FOR P V C

Swift's EPOXOL 7-4 is a new, high-purity epoxidized oil especially processed to provide improved compatibility with resins such as P.V.C. It is higher in oxirane for more efficient, economical usage. It is lower in by-products to help promote fast, controlled and predictable results.

Check the specifications. Oxirane oxygen is high for good heat stability. Low viscosity indicates low polymer content. Low infra-red absorption shows low hydroxyl content. Iodine value is minimum, consistent with low by-products. Odor is low, as well.

The best way to learn about Epoxol 7-4 is to test it yourself. Return the coupon below for details on a trial quantity.

SPECIFICATIONS
EPOXOL 7-4
(Swift's Epoxidized Soybean Oil)

Oxirane Oxygen	7.0% Min.
% Conversion to Oxirane Oxygen	94% Min.*
Iodine Value	2 Max.
Gardner Color	Less than 1
Gardner Viscosity 25°C/25°C	0 Max. (3.4-3.7 Poises)
Saponification No.	180 Max.
Acid No.	0.20 Max.
Absorptivity @ 2.8 Microns (Corrected for Background)	0.01 Max.
Specific Gravity 25°C/25°C	0.990-0.995

**Ratio of epoxidation to total oxidation x 100.*

SWIFT & COMPANY • Technical Products Dept.
1812 - 165th Street, Hammond, Indiana

To Serve Your Industry Better

Swift

105TH YEAR

SWIFT & COMPANY, Technical Products Dept. TP-2
1812—165th Street, Hammond, Indiana

Please send me data on Swift's Epoxol 7-4 for (Please describe need or intended usage.) _____

_____

Company _____
(Please Print)

Address _____

City _____ Zone ____ State _____

Your Name and Position _____

For Epoxy Resins, there's no better or more economical way to get color than with Ferro Paste Colors.

Better because of compatibility with epoxy resins. Economical because more pigment is concentrated into a given amount of vehicle. Easy dispersion, too.

Write for technical data and color chart.

FERRO CORPORATION
Color Division

4150 E. 56th St., Cleveland 5, Ohio · 5309 S. District Blvd., Los Angeles 22, California · Ferro Enamels (Canada) Ltd., Oakville, Ontario, Canada

THE PLASTISCOPE

(*From page 218*)

rather than density. The white foam is available in thicknesses ranging from 1/16 to 20 in. in 1/16-in. increments.

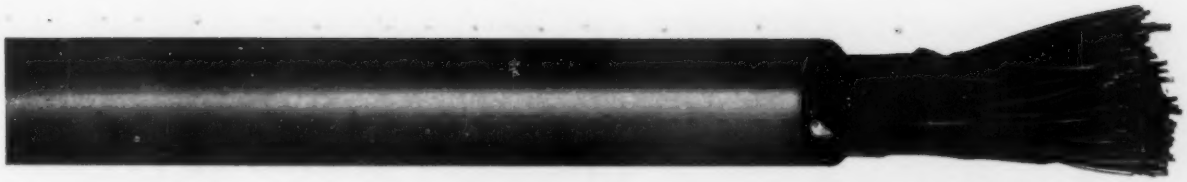
PVC foam in long sheets. Highside Foam Products Inc., Clifton, N. J., is producing chemically blown vinyl foam in a continuous process and can supply the open cell material in 20-yd. rolls, in widths up to 48 inches. The continuous process is said to produce material of more uniform quality than the batch process more commonly employed. Called Hi-Vi, the company's material is available in densities from 5 to 7 lb./cu. ft. in thicknesses from 1/8 in. in various colors. Vinyl foam can be heat sealed and can be laminated to cloth and the company expects to find a wide market in the textile-conversion field for quilted products, shaped cushions, and similar merchandise.

Do-it-yourself kit. A compact kit for mixing urethane foam, containing pre-mixed chemical components (prepolymer) capable of creating rigid foam to fill areas as small as a cubic foot, is packaged by Dayton Rubber Co., Dayton, Ohio. It is expected to appeal particularly to motor boat and yachting enthusiasts for filling boat flotation chambers in small boats, insulating fuel tanks and exhaust pipes, and reinforcing structural elements.

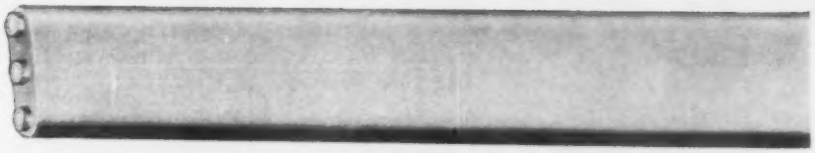
Release agent. A mold release agent, designated Mold Wiz I-C, developed especially for urethane foams, is available from Axel Plastics Research Laboratories, 1070-72 Manhattan Ave., Brooklyn 22, N. Y. It comes in emulsion and solution, as well as paste form.

Fluorocarbons

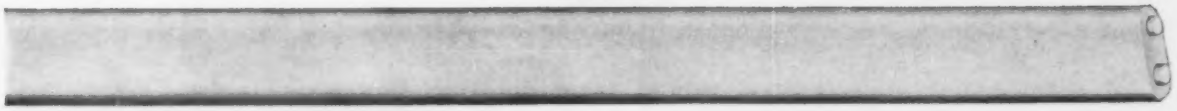
Approved for dairies. Gaskets and equipment lining of Teflon 6 TFE- fluorocarbon resin are acceptable for commercial dairy equipment, and meet the requirements of milk handling, according to the Food **(To page 223)**



A VITAL PART



OF YOUR VINYL INSULATION...



THE RIGHT PLASTICIZER

The service life and performance of your vinyl insulation compound center around its plasticizer. In addition to providing good electrical properties, the Rohm & Haas plasticizers listed here impart exceptional resistance to plasticizer extraction by water, soapy water, and oil. They have very low volatility, and high resistance to migration into lacquers, baked enamels, rubber, and polystyrene. Furthermore, vinyls using these plasticizers show excellent retention of physical properties on exposure to high temperatures. Key uses for the individual grades include:

MONOPLEX S-90E—applications requiring retention of resistivity, tensile strength, and elongation after long-term high-temperature aging (either dry, immersed in water, or exposed to high humidity).

PARAPLEX G-54—standard appliance wire, including 105°C insulation; has particular merit wherever 1) retention of compatibility under high humidity exposure and 2) freedom from plasticizer migration into polystyrene, rubber, lacquers and other coatings are required.

PARAPLEX G-50—also for standard appliance wire, particularly when cost is an important factor.

PARAPLEX G-62—provides stabilization against heat; ideal for high-temperature insulation; also can be used in stabilizer quantities with general purpose plasticizers in lower-cost wire such as extension cords.

Get technical information on these and other Rohm & Haas plasticizers. Write for a copy of *What You Should Know about* PARAPLEX *and* MONOPLEX *Plasticizers.*

Chemicals for Industry

ROHM & HAAS COMPANY

THE RESINOUS PRODUCTS DIVISION

Washington Square, Philadelphia 5, Pa.

PARAPLEX *and* MONOPLEX *are trademarks, Reg. U.S. Pat. Off. and in principal foreign countries.*

PARAPLEX & MONOPLEX

HERE'S Taber®

Plus Profit

on SHEET PLASTIC PACKAGING

One Operator does the work of TWO! Here's a happy note in economy!

Now ONE operator can fabricate up to 500 plastic cylinders 1½" up to 8½" in diameter and up to 10" in length on the Taber Cylinder Fabricator and BEAD BOTH ENDS on its companion machine, the Taber Thermatic Cylinder Beader. As operator removes completed cylinder from the Fabricator, he merely places it in Beader chute. The Beader automatically grasps each cylinder, beads both ends and EJECTS completed job into hamper. Fabricator quickly shapes and heat seals by pressure bar. Automatic expanding mandrel insures identical diameters throughout production. Beader can also accommodate cylinders 1⅛" to 15" in length and produce 500 to 900 pieces per hour.

WRITE FOR LITERATURE describing folding, creasing, beading, and forming machines.

TABER INSTRUMENT CORPORATION

111 Goundry Street — Section 22
North Tonawanda, New York
Telephone LUdlow 2626 — TWX - TON 277

S&K Hobbing press Cuts Costs & Speeds Up die cavity production . . .

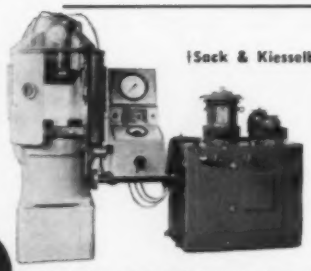
Here's what S & K Machines can offer you . . .

- Accurate Depth Control to .001
- Pre-selected Pressure Control*
- Stepless Hobbing Speed Control
- Shatter-free change over from low to high pressure
- Preselected depth control*

Models available from 100—8,000 ton capacity

*Patented

Cold Heading Dies • Injection Molding Dies • Forging Dies • Plastic & Rubber Molds •



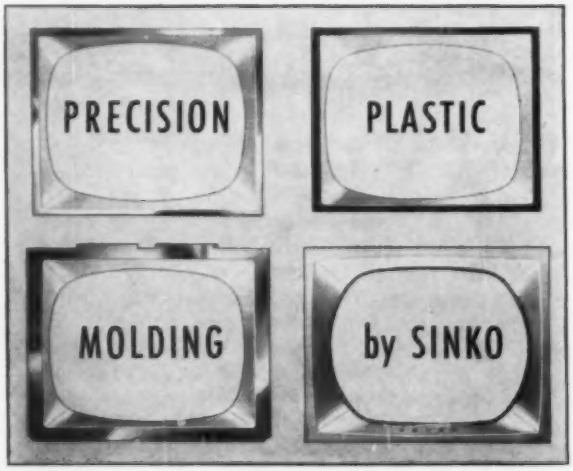
Sack & Kiesselbach

Haller

Exclusive Representative in The U.S.A.

HALLER, Incorporated

16580 Northville Road, Northville, Michigan



The TV Masks pictured are being mass produced by Sinko for one of the country's leading manufacturers. Our advanced method of molding them in multiple colors by an automatic spray and roller-coating process has resulted in increased efficiency and lower production costs.

We can cut your costs too . . . on Plastic Moldings!

WE MOLD ALL THERMOPLASTICS . . . from 2 to 175 oz.

Sinko MANUFACTURING and TOOL CO.

7310 W. WILSON AVE. • CHICAGO 31, ILL.

Offices in Principal Cities Throughout the United States

THE PLASTISCOPE

(*From page 220*)

& Drug Administration. The FDA statement is based on tests which began in Du Pont laboratories more than three years ago.

The development opens the way for use of the resin in redesigning present dairy industry equipment to give easier operation, better hygiene and lower costs through reduced maintenance and down time, according to Du Pont. The resin is expected to be used primarily by the milk processing industry for gaskets and lined equipment such as valves, fittings, and pipe. Conventional equipment relies on expensive metal alloys to withstand the frequent dismantling, brushing, corrosive cleaning solutions, and steam sterilization required in milk processing establishments.

Laboratory plugs. Teflon stopcock plugs, with threaded ends fitted with Teflon lock washer and nut to provide a positive load, have been added to the Kimax laboratory ware line by Kimble Glass Co., subsidiary of Owens-Illinois. According to the company, "frozen" stopcocks are eliminated, even after extended contact with strong caustic solutions. Because of its low coefficient of friction, no grease lubrication is necessary thus eliminating the problem of solution contamination.

Coloring service. A process developed by Colorite Industrial Dyers is claimed to dye Teflon parts and wire almost any color without affecting either the physical properties of the material or the tolerances of the parts.

At present, Teflon parts dyed by Colorite will withstand temperatures up to 300° F. without discoloring, according to the company. The firm will dye Teflon parts for manufacturers or processors at its New York plant.

Teflon-impregnated glass cloth. A new laminate made from glass cloth impregnated with Teflon resin is available from Continental-Diamond Fibre Corp., Newark, Del. Designated Dilecto GB-108TED, the new **(To page 224)**

SALES GO UP!

WHEN YOU USE PLASTIC ODORANTS *by* FRITZSCHE

Odorants increase the sales appeal of finished and intermediate plastics in two ways: by neutralizing the natural malodor of basic resins and additive compounds; or by imparting a fragrance suited to the product — an important factor in many consumer items. We believe that the right odorant in your product is an extra salesman on your staff. Write today for the FREE booklet "Plastic Odorants By Fritzsche."

FRITZSCHE BROTHERS, INC.
PORT AUTHORITY BUILDING
76 Ninth Avenue, New York 11, N. Y.
(BRANCH OFFICES IN PRINCIPAL CITIES)
EST. 1871

"PRO" Little Giant Injection Molding Press — Pneumatic —

Check the "Big Giant" features

Automatic Cycle Speed—50 to 500 p/h
Automatic Cylinder Heat Control: ± 1°
Automatic Mold Heat Control: ± 1°
Automatic Hopper—For Accurate Feeding
Automatic Nozzle Shut-Off Valve
Automatic Ejection of Molded Items

1/3-Ounce Capacity Completely Automatic

Semi-skilled operator can set up and operate press in 30 minutes . . . press operates on 100 psi line pressure . . . bench space required—18" x 30" . . . press height—26".

***Simplomatic* Mfg. Co.**
Dept. MP-1259, 4416 W. Chicago Ave.
Chicago 51, Ill., U.S.A.

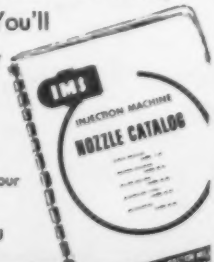
IMS
INJECTION MACHINE NOZZLES

ANY TYPE MADE TO ORDER!

WORLD'S LARGEST STOCK! PROMPT DELIVERY ON SPECIALS!

Cut your nozzle cost! Take advantage of our large nozzle stock. Prompt 3-4 day delivery of ANY type nozzle on receipt of sketch. You'll save money with IMS nozzles!

Send today for your FREE Nozzle Catalog



INJECTION MOLDERS SUPPLY COMPANY
3514 LEE ROAD • CLEVELAND 20, OHIO

grade is designed for corrosive environments in gaskets and seals, and for flexible electrical insulation. The glass cloth is covered on both sides with a Teflon resin film, which is said to be free of pinholes. It comes in continuous, natural-color, smooth-finish sheets in coils of 0.009 in. standard thickness, in maximum widths of 6 in., and lengths up to 75 feet. It can be supplied with one or both sides cementable.

General Plastics Corp., Paterson, N. J., has developed endless belts made of Teflon-impregnated glass fabric, which are said to be ideally suited for resin conveyors. Since the base cloth is composed of glass fibers, the conveyor can operate well into the 400° F. range without being affected, the company states.

This type of belt can also be used for heat-sealing applications, since films will not adhere to the Teflon surface, even at flow temperatures. The belts are available in widths up to 50 in., and for most applications 0.010-in. thick fabric has been found satisfactory to the company.

Skived tape. A new bondable skived Teflon tape, tradenamed Korabond, is available from Dixon Corp., Bristol, R. I. According to the company, the tape is given fusible properties, so that when wrapped on wire for instance, and heated to over 620° F., it completely bonds to itself and solidly shrink-fits to the wire conductor.

The company claims that Korabond tape can be used as a replacement for the more expensive Type B unsintered extruded Teflon tape, since it fuses as well as Type B. It is available in widths up to 4 in., and in thicknesses of 0.0005, 0.001, 0.002, 0.003, and 0.004 inches.

Bonds Teflon-clad wires. A pure epoxy resin solids adhesive, designated Helix R-313, and marketed by Carl H. Biggs Co., Santa Monica, Calif., has been used by the Luther Manufacturing Co., N. Hollywood, Calif., as a potting compound for radio noise filter assembly where an extremely strong (To page 226)

HERE'S THE HOT ONE!

WATLOW

Electric Heating Units for every application!

Narrow-Band Cylindrical Units
FIREROD Cartridge Heating Units
Tubular Heating Units

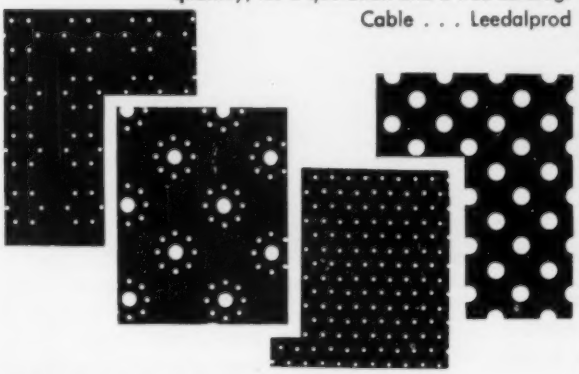
WATLOW
ELECTRIC MANUFACTURING COMPANY
1364 Ferguson Avenue
St. Louis 14, Missouri

PERFORATIONS

. . . . TO SUIT YOUR NEEDS

For ornamentation and technical purposes

Complete range of patterns . . .
hole-sizes from invisible to 3/16" diameter.
Vinyls, acetate, polyethylene, cellophane, mylar, plastic-coated fabrics, paper, rubber, etc., in sheet or rolls.
Send us a sample of your material, stating width and quantity, for a quotation and a free catalog.
Cable . . . Leedalprod



PERFORATED SPECIALTIES CO. INC.
351 West 35th St., New York 1, N. Y. LOngacre 3-5278

Introducing the new CARVER MARK IV PLASTIC LAMINATOR

This portable, desk-top laminator processes tamper-proof, moisture-proof, life-time laminations: cards, badges or photographs. Extremely simple, reliable. Self-contained; requires only normal AC outlet. Thermostat control for automatic heating, cooling. Capacity up to 60 wallet size cards or 120 badges per hr. Write for illustrated bulletin.

FRED S. CARVER INC.
HYDRAULIC EQUIPMENT
18 CHATHAM ROAD, SUMMIT, N. J.

The white glove is worn by every worker who handles CD melamine foils. Immaculate, almost hospital-like conditions guard the quality of CD products... guarantee production of profitable melamine dinnerware. When you specify melamine foils by Commercial Decal, you can be confident of a quality product. You can also be sure of foils produced in volume, delivered on time. Special patterns may be commissioned. For full information, write or phone.

America's most experienced producers of melamine foils
COMMERCIAL DECAL
Mount Vernon, New York

AT YOUR SERVICE

THE RESULTS OF 30 YEARS OF RESEARCH ON ORGANIC PEROXIDES

For over three decades we have specialized in the manufacture of organic peroxides. Today our peroxides are outstanding in quality and closely controlled uniformity. During all these years we have maintained a progressive program of research and development work for the purpose of making organic peroxides and their compounds available to industry in the form best suited to each particular application. We are confident that in the groups of organic peroxides listed below you will find the key to some of your processing problems.

Diacyl Peroxides **Dibasic Acid Peroxides**
Ketone Peroxides **Aldehyde Peroxides**
Alkyl Peroxides & Hydroperoxides
Alkyl Peroxyesters

Our Research and Technical Staffs invite your consultation.

WRITE FOR A COPY OF

1. "The Evaluation of Organic Peroxides in Terms of Half-Life Data." A paper resulting from Research by LUCIDOL.

2. "The Use of Organic Peroxides in the Reinforced Plastics Industry." A paper on proper method of storage and handling of organic peroxides.

3. New Bulletin covering our enlarged line of LUCIDOL Organic Peroxides.

LUCIDOL DIVISION
WALLACE & TIERNAN INCORPORATED
1740 Military Road
Buffalo 5, New York

THE PLASTISCOPE

(*From page 224*)

bond to unetched Teflon-shielded wires, virtually zero shrinkage, and excellent adherence to cold rolled steel was essential.

The compound also had to be impervious to jet engine fuel and synthetic hydraulic oil, as well as being resistant to temperatures ranging from —40 to 300° F.

Teflon-lined pipe. Chemically inert dip pipes said to withstand severe agitation and thermal shock at temperatures up to 500° F. have been added to the line of Fluoroflex-T piping components made from Teflon by Resistoflex Corp., Roseland, N. J.

The new TS dip pipe consists of a Schedule 40 steel housing completely lined and jacketed with the fluorocarbon material. The reinforcement provides the shock resistance required in agitated reaction vessels.

The company manufactures transfer hose with an abrasion-resistant rubber jacket, reinforced with a spiraled high tensile wire to prevent crush or collapse, and with a layer of Fluoroflex-T which is carried through the hose and over the face of the flange. The adhesive surface of the Teflon is claimed to permit rapid flow of fluids with little or no buildup of corrosive solids.

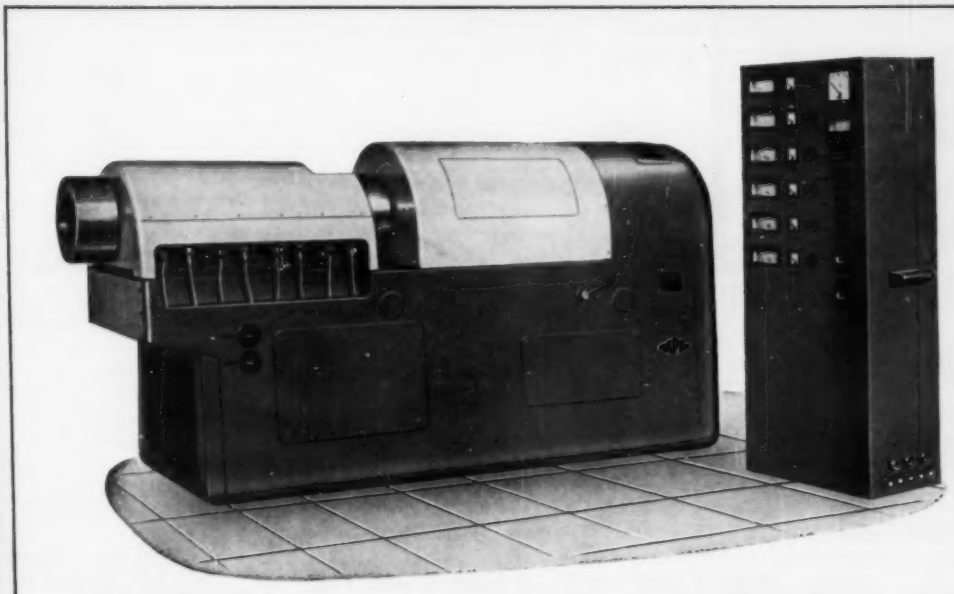
Simplifies bonding. A fast, simple method of bonding Teflon to itself and to other materials has been developed by W. L. Gore & Associates Inc., Newark, Del. The basis of the system is an activated form of sodium in solution. Designated Tetra-Etch, the solution reacts with Teflon to form a carbonaceous film on the treated surface, which serves as a means of anchoring the adhesives. The compound is said to have proved compatible with a variety of adhesives including epoxies, phenol formaldehydes, and most of the rubber and silicone types.

The solution is poured or swabbed onto the surface to be treated—or the end is dipped in the bottle of solution. Later, the residue is wiped off, or flushed off. Treat- **(To page 228)**

MAPRE

TWIN-SCREW EXTRUDERS

for Extrusion
and Granulating
of all thermoplastic Materials
including Hard-PVC-Powder



Diameter of screw 64 mm, 92 mm, 102 mm, approx. 2½ in., 3⅝ in., 4 in.

MAPRE S.A. DIEKIRCH
(Gd. Duché de Luxembourg)

England:
K. W. Chemicals Ltd.
55/57 High Holborn, London W.C.1

Norwegen:
Sivilingenior Fritjof Eitzen
Lille Grensen 5, Oslo

Schweden:
Lindberg + Sydow AB
Kornhamnstorg 49, Stockholm

Dänemark:
A/S Nordisk Brown Boveri
Nyropsgade 24, Kobenhavn

Deutschland:
Bardt + Co. GmbH, Steinweg 9
Frankfurt a. M.

Oesterreich:
Gebrüder Schoeller
Wipplingerstrasse 25, Wien 1

Schweiz:
Übersee-Handel AG
Dufourstrasse 56, Zürich

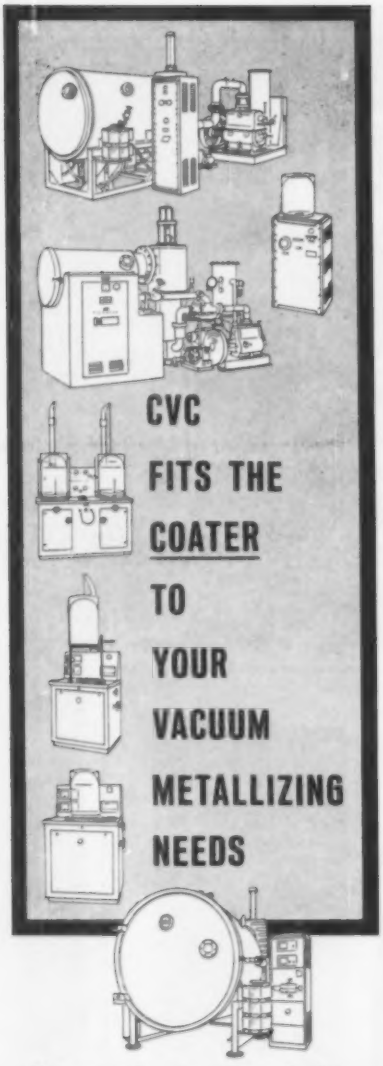
USA:
Package Machinery Company
East Longmeadow/Mass.

Italien:
SVEVIA S.R.L., Via Olmetto 10
Milano

Frankreich:
Fenwick S.A., 8, rue de Rocroy
Paris 10e

Belgien:
Fenwick S.A. Belge
3 et 4, Quai des Ardennes, Liège

Portugal:
Intermedia Lda.
Avenida Duque d'Avila, 169, Lisboa



For example, you can apply decorative or functional metallic finishes to thousands of units per hour with the huge 72″ CVC Coater pictured just above. Or coat pieces as large as 22″ x 50″ on a profitable volume basis.

You'll find a right-size CVC Coater (from 12″ to 72″ chamber diameter) to meet every need—from production to pilot plant to laboratory.

Volume is greater and costs are less than by any other finishing method. And they're easy to use—no special training required.

WRITE us for more details. Just ask for Metallizing Bulletins.

Consolidated Vacuum Corporation

ROCHESTER 3, NEW YORK

THE PLASTISCOPE

(From page 226)

ment time ranges from about 5 sec. to 1 min., depending upon the type of application and conditions. According to the company, resulting peel strength with a typical epoxy adhesive runs from about 17 p.s.i. on smooth Teflon to 35 p.s.i. on corrugated ribbon. No special equipment is needed.

New dielectric material. A glass-Teflon electronic insulating material for use in high temperature applications is available as copper clad sheet and as rod, tubes and flat sheets from Rogers Corp., Rogers, Conn.

Designated Duroid 5870, it is composed of micro-glass fibers uniformly coated with Teflon. The material was developed primarily for use as a high temperature circuit base stock, missile antenna dielectric, and microwave strip insulation. To assure proper functioning at elevated temperatures a film of Teflon 100X is used as a bonding agent.

The new material is said to be a homogenous structure which permits close tolerance control, avoids "window" effect common to woven glass structures and eliminates moisture wicking along the fiber. Rogers will also supply the material fabricated as punched and machined parts.

Expansion

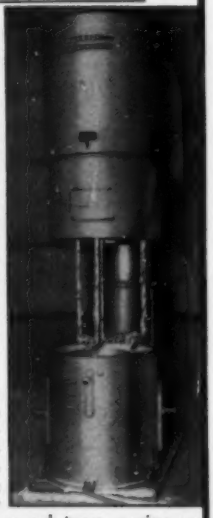
Naugatuck Chemical Div., U. S. Rubber Co., has started an expansion program at its Painesville, Ohio, Marvinol vinyl resin plant which will raise the plant's capacity by more than 30 percent. When this project is completed in July, the plant will have an approximate capacity of 65 million lb. annually, according to **Earle S. Ebers**, vice-president and general manager. Emphasis in this new expansion will be placed on raising the plant's capacity to produce plastisol-grade resins.

SunOlin Chemical Co. plans to expand facilities in North Claymont, Del., to include the manufacture of ethylene. The new plant, costing about $15 million, will have a **(To page 230)**

FOR PROPELLANT---
OR PLASTISOL*

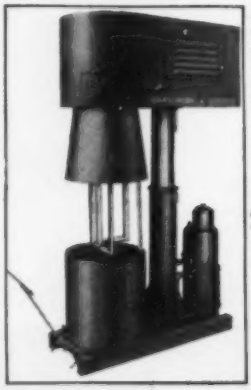
ROSS DOUBLE PLANETARY
Change Can Mixers give better mixing in less time!

At *Thiokol*® solid propellant plant in Elkton, Md., this Ross #130CDM variable speed 100 gallon Mixer produces the **same high quality mix as obtained in Horizontal Double Arm Kneaders, and in ⅓ the mixing time.**



With no bearings or stuffing boxes in the product zone, stationary can, completely enclosed mix, and remotely controlled raising and lowering device, the Mixers are as safe in operation as they are efficient. Mixers have low original and maintenance cost, are easy to clean, and extremely versatile in operation.

Lower Illustration shows an 85 gallon #130-CDM Double Planetary Change Can Mixer furnished a leading concern for mixing plastisols of several types ranging up to 200,000 centipoises. Customer reports Mixer in operation 24 hours/day with mixing time per batch only 15-20 minutes; while the quality of mix and dispersion is so high that the final product is obtained in the Mixer alone — without further processing through a Three Roll Mill as was previously necessary with other Mixers.



Jacketed cans for heating or cooling material during mixing, dolly trucks, gates on cans for discharge, and vacuum tight covers can be provided.

*---or any other heavy paste material. On paints, inks, pharmaceutical products, caulking compounds, and other similar materials, the Ross Double Planetary Change Can Mixers mix and disperse up to 30 times faster than other Mixers.

Mixers available in 1, 2, 3, 4, 6, 8, 12, 20, 25, 65, 85, 125 and 150 gallon sizes. Write for complete information on these or other types of Ross mixing, grinding or dispersing equipment!

CHAS. ROSS & SON CO., INC.

Leading mfgrs. of wet or dry grinding Mills, Kneaders and Mixers of all types — since 1869.

150-152 Classon Ave., Bklyn. 5, N. Y.

CUSTOM DESIGNED MACHINERY . . . . by EEMCO

COSTS NO MORE!

Let us prove to you that we design and build machinery to your specifications at less cost than so called standards. Whether it be one press or a line of presses, individual or central systems, it will pay you to investigate EEMCO.

. . . designers and builders of a complete line of MILLS & PRESSES

EEMCO

ERIE ENGINE & MFG. CO.

954 East 12th St.,

ERIE, PENNSYLVANIA

4, 4′ DIAMINO DIPHENYL SULFONE

a new curing agent for epoxy resins with excellent structural properties at elevated temperatures

EPORAL®

(4,4′-Diaminodiphenyl Sulfone)

•

Available from stock in New York

•

Write for information and samples

ROUSSEL CORPORATION

155 East 44th Street, New York 17, N. Y.
OXford 7-5820

Solve your Difficult Marking problems

with **KENSOL**
HOT STAMPING PRESSES

Kensol Presses are available in three pressure ranges: Light-Weight, Medium-Weight, and Heavy-Duty.

The proper model is available to meet any production requirements: Hand-operated, Air-operated, Semi-Automatic & Completely-Automatic.

Compressed air operation adjustable electric dwell-timer, thermostatic heat control and rugged construction are a few of the features which assure fine quality marking.

KENSOL 15T
Light-Weight
Air-Operated Power Press

and
OLSENMARK ROLL LEAF

Fine quality, economically priced roll leaf in genuine gold, imitation gold and silver, and both flat and Enamel pigment colors.

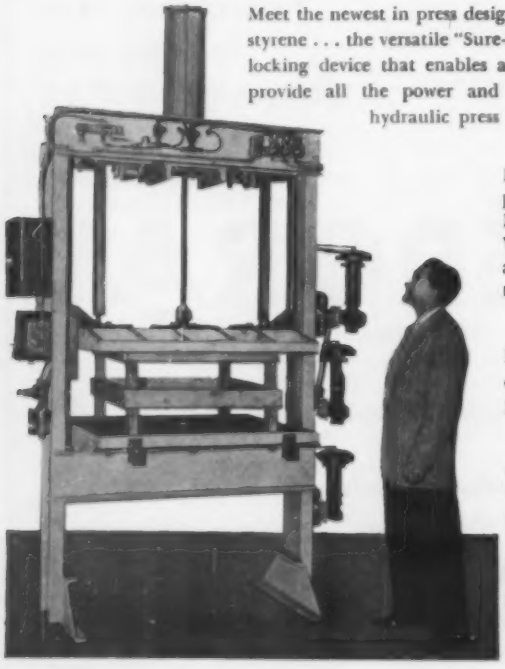
OLSENMARK Corporation

Write for complete literature!

124-132 WHITE ST., NEW YORK 13, N. Y.

Specialists in Quality Marking Equipment and Supplies for over 30 years

Now – a really LOW COST
Press for Molding Expandable Polystyrene



Meet the newest in press design for molding expandable polystyrene . . . the versatile "Sure-Lok" press featuring a patented locking device that enables an electrically-operated press to provide all the power and positive holding action of a hydraulic press at only a fraction of the cost.

Platen sizes built to fit your production needs. Platen on M603 (shown) 42" x 36". Write today for specifications and amazingly low prices on this all new press.

Molds: All sizes, custom and block
Pre-Expanders

Polystyrene Machinery Division

Miller Van Winkle Co.*
Paterson 2, New Jersey
Phone: MU 4-5920

*Patent applied for

THE PLASTISCOPE

(*From page 228*)

capacity of nearly 200 million lb. a year. A portion of the ethylene will be converted to ethylene oxide and glycol to meet developing needs on the East Coast. The new plant is in the heart of a large petroleum refining area.

SunOlin is an equally-owned affiliate of **Sun Oil Co.** and **Olin Mathieson Chemical Corp.** Dry gas from Sun Oil's Marcus Hook, Pa. refinery will be used for the production of ethylene. The SunOlin plant in Delaware is adjacent to Sun's refinery. Major users of these olefins can be readily served by pipeline, according to the company.

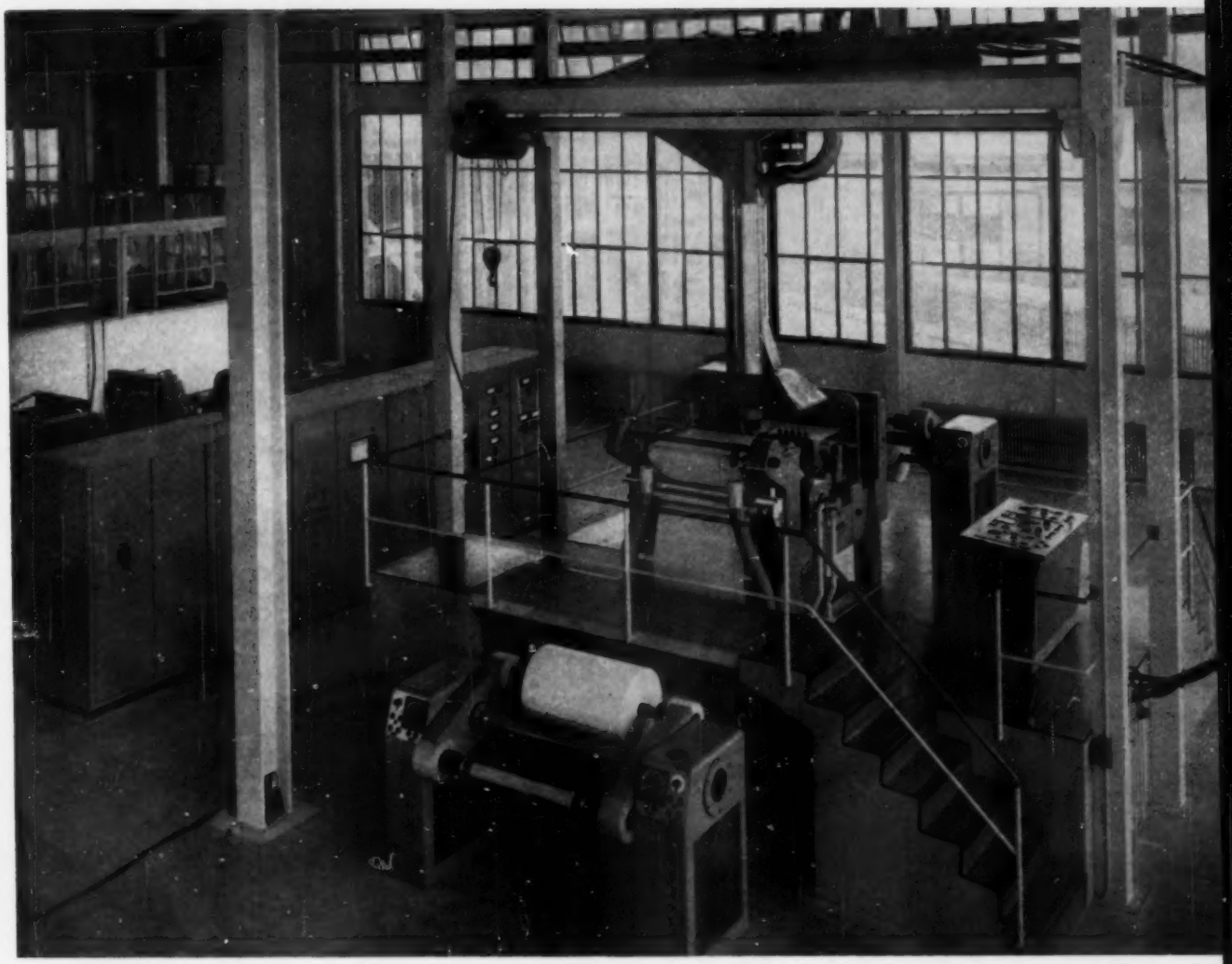
Western Petrochemical Corp. Polymer Div. has completed new R & D laboratory facilities at Chemical Industries Park, Newark, N. J. The laboratories will be under the direction of **Dr. Norman C. Gaylord,** R & D vice-president of the division.

Continental Can Co. has set up a Plastic Bottle and Tube Div., with headquarters in Chicago, Ill. **Charles F. Lenhard,** formerly plant manager of the Chicago plastic bottle plant, has been named manager of the new division. Previously, the responsibility for running the plastic bottle operation at its Chicago plant was assigned to the firm's Paper Container Division.

Continental is also planning to establish manufacturing facilities on the East and West Coasts and another in the Midwest.

Reichhold Chemicals Inc. is spending approximately $2,500,000 to enlarge its phenol plant at Tuscaloosa, Ala., which will increase RCI's phenol production at this facility from its current 60 million lb. a year level to 90 million lb. annually.

Reichhold Chemicals Ltd., Canada, bought the Lindsay, Ont. plant of **Varcum Chemical Div.,** which was recently acquired by Reichhold Chemicals Inc. The plant is reportedly the second largest producer of phenolic molding compounds in Canada. Resins used in **(To page 233)**



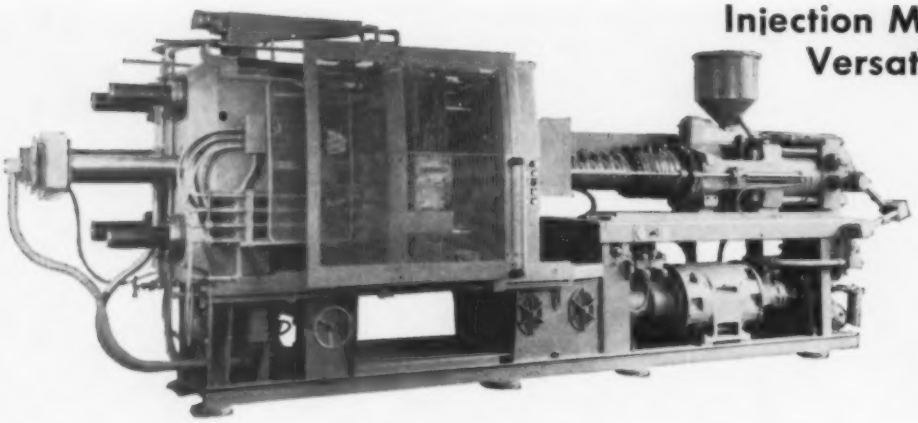
Oerlikon Extrusion Coating Plant

MODEL PL 100

A revolutionary new-construction designed to coat paper, aluminum- and cellophane-foils as well as textiles with thermo-plastics. Width between 40 and 100 cm (approx. 10″ - 40″)

Suppliers of complete equipment, consisting of: vertical extruder with wide-slot nozzle; winding up / winding off machine; roller-stand with differential measuring equipment; control cabinets / switch panel (electronic control)

Oerlikon Plastics Ltd. STANS/NW Switzerland



Injection Molding's Most Versatile Performer!

IMPCO®

Announcing **the new 20 ounce Impco**

Model HA16–425 **720 Dry Cycles Per Hour**

200 Pounds Per Hour Plasticizing Capacity

24½ Inch Stroke **Hydraulic Knockout**

IMPROVED MACHINERY INC. NASHUA, NEW HAMPSHIRE

In Canada, Sherbrooke Machineries Ltd., Sherbrooke, Quebec

Export Distributors: Omni Products Corp., 460 Fourth Avenue, New York, New York

---

UREA

and

CYCOLAC®

PLASTICS

Can now be successfully and easily vacuum-metallized with

VERNON

SPECIALTIES, INC.

#51R METALLIZING LACQUER

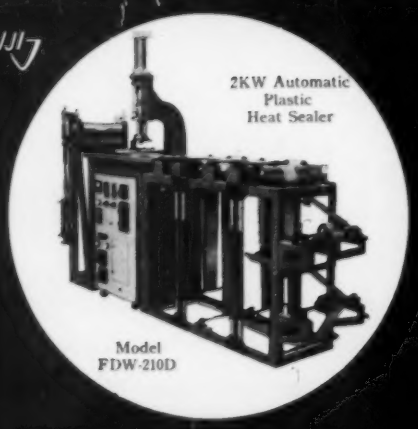
Samples and Literature upon Request

North Tarrytown, N. Y.

®Registered trademark of Marbon

Operates completely automatically or manually!

FUJI



Most Convenient & Highly Efficient....

HIGH FREQUENCY WELDER

This Heat Sealer is workable either automatically or manually. In the former, a definite operational cycle is followed due to complete interlocking of the press, generator and indexer. In the latter, the cycle is broken down into its respective components.

Other Lines

Preheaters & Instruments

FUJI ELECTRONIC INDUSTRIAL CO., INC.

46 Minami-cho, Itabashi-ku, Tokyo, Japan

Cable Address: "ELCOFUJI TOKYO"

THE PLASTISCOPE

(*From page 230*)

the molding compounds will come from the Ste. Therese de Blainville, Quebec, plant of Reichhold Chemicals Ltd.

The Borden Chemical Co. has started production of acrylic emulsions in a new manufacturing plant at Demopolis, Ala. The new unit is the fourth the company has established for these products. The others are at Leominster, Mass., Illiopolis, Ill., and Compton, Calif.

Philip Shuman & Sons moved from 15-33 Goethe St. to a new 20,000-sq.-ft. plant and warehouse at 571 Howard St., Buffalo, N. Y. The larger quarters will be used for sorting, grinding, processing and sealing of reground and virgin molding powders.

Cortland Industries Inc., Chicago, Ill. fabricators of plastics, vulcanized fiber, and paper specialties, has purchased the former plant of **Groen Mfg. Co.,** cooking utensils manufacturer, at 4545 W. Armitage Ave., Chicago, and is remodeling the 60,000-sq.-ft. unit.

All of Cortland's vacuum-forming facilities will be located in the new building which will replace the company's present vacuum-forming plant at W. Diversey St., Chicago.

Furane Plastics Inc., Los Angeles, Calif., formulators of epoxy resins, has opened a 6000-sq.-ft. Eastern plant in Hempstead, N. Y. **Leon Wynn** will serve as Eastern sales manager and will be in charge of the operation.

Hastings Plastics Inc., Santa Monica, Calif., has acquired an additional 4000 sq. ft. of warehousing space adjacent to existing facilities.

Deecy Products Co., Cambridge, Mass., has broken ground for a new installation for handling molten phthalic anhydride. Much of the equipment, including electronic controls, is novel in this application. Since the company is now handling up to half a million lb. of anhydride **(To page 235)**

put

reprints

to work

Reprints of articles, features and news items that appear in Modern Plastics are often surprisingly inexpensive when ordered in quantity. Many companies make it a practice to have stories which have a bearing on their business reprinted for distribution to their personnel, customers, prospects, stockholders or to other interested groups.

Whenever you see editorial matter of this type in Modern Plastics magazine or the Encyclopedia Issue which you can use in reprint form, in quantities of 200 copies or more, write and quotations will be furnished promptly.

INDUSTRIAL MAGAZINE SERVICE

An Affiliate of Breskin Publications

575 Madison Avenue, New York 22, N. Y.

MEMO TO USERS OF DIRECT MAIL

Do you have a list of prospects or inquiries for your product? You can receive extra income by renting them to non-competitive firms.

Or you may find it more lucrative to sell your list outright. We'll pay you cash. Many national business firms find it MORE profitable to sell us their names, instead of investing time and money maintaining them. Why not you?

No Salesman will call. You are under no obligation. Just drop a note on your letterhead telling us how many names you have on hand; how recently they were acquired; and any other pertinent information. We'll contact you promptly.

ACTIVE MAIL ORDER LIST CO.

Miss M. Porter
241 Lafayette Street
New York 12, N. Y.
Phone WAlker 5-2450

This NEW 3" x 8" THROPP MILL *expedites* rubber and plastics research

Aided by many years of experience in designing laboratory mills, Thropp engineers have developed this up-to-date 3" x 8" model. It sets new standards for attractive modern design, compactness and economical maintenance.

The new mill, designed for processing small batches, is one of the Thropp family of rubber and plastics mills, ranging in size up to 84" The machine has tilting type guides to facilitate thorough and rapid cleaning and prevent carry-over of color or other contamination to subsequent batches.

Manufacturers who appreciate the importance of fast, accurate, economical research and development work will find this machine a sound investment. Send for further information.

Wm. R. THROPP & Sons

Division of J. M. LEHMANN COMPANY, Inc., 551 NEW YORK AVE., LYNDHURST, N. J.

THE PLASTISCOPE

(From page 233)

a month, this is expected to effect substantial savings, as well as increasing production.

Deceased

Otto Haas, 87, founder and honorary chairman of the board, **Rohm & Haas Co.,** died Jan. 2. He established the German partnership in 1907 and founded the U. S. company in 1909.

Frank C. Rowley, 54, product manager, molding compounds, **Durez Plastics Div., Hooker Chemical Corp.,** died Jan. 7, following a short illness.

Meetings

Plastics groups

Mar. 17: Quebec Rubber & Plastics Group, "Weathering of Elastomers." Queens Hotel, Montreal, Quebec, Canada.

Mar. 30, 31: The (British) Plastics Institute, Conference on "Polymeric Progress," Wm. Beveridge Hall, London University, London.

April 7, 8: The Society of the Plastics Industry Inc. (S.P.I.). 17th Annual S.P.I. Western Section Conference, New Riviera Hotel, Palm Springs, Calif.

April 20: Society of Plastics Engineers Inc., N. Texas Section, Annual Regional Technical Conference, "Plastics in the Petroleum & Chemical Industries," concurrent sessions on surface coatings and plastics structures, Hotel Texas, Ft. Worth, Texas.

April 20, 21: S.P.I. Cellular Plastics Div. Automotive Conference, Statler Hotel, Detroit, Mich.

April 20-22: S.P.I. 3rd Annual Fluorocarbons Div. Meeting, Hotel Roosevelt, New Orleans, La.

April 25, 26: S.P.I. (Canada), 18th Annual Canadian Section Conference, London Hotel, London, Ont., Canada.

Other groups

April 4-7: American Management Association, 29th National Packaging Exposition and Conference, Convention Hall, Atlantic City, N. J.—**End**

WITH

CALCO® OIL BLUE ZN

The reddest and cleanest Oil Blue available!

Why take a chance with unreliable dyes . . . when you can always score with Calco Oil Blue ZN! Here is a blue dye to make the job of polystyrene color compounders an easier one.

Cyanamid's years of experience in the plastics field have produced a dye which yields bright, strong, economical, transparent effects plus excellent advantages as a component for blacks and re-work runs. It is exceptionally fast to light and its reputation for purity safeguards against streaking and cloudiness. *Its uniformity is guaranteed.*

To find out more about dyes that work better, look better...call on Cyanamid...trained dye specialists for the plastics industry.

CYANAMID

AMERICAN CYANAMID COMPANY • DYES DEPARTMENT • BOUND BROOK, N. J.

COMPANIES...PEOPLE

Appointments, promotions, and relocations in the plastics industry.

The Dow Chemical Co.—Coatings Technical Service (CTS): **Walter A. Henson,** former head of the CTS monomer and resin section which has been discontinued, heads the newly formed New Projects Group.

The following head the sections of the new group: **R. E. Erickson**—aqueous, which will handle all new water dispersible coating materials; **M. E. Kelly, Jr.**—non-aqueous, responsible for resinous solvent-soluble or heat-activated materials; and **R. L. Brown**—monomer, handling all new and old monomer products. **M. W. Zembal** takes charge of the CTS-South operation from Freeport, Texas. **Roy S. Simon,** in charge of CTS-West operations, promoted to section head with increased responsibility. **Ralph C. Hand,** formerly head of bldg. products, named section head of a new group, the plastics and rubber section, which covers CTS monomer and epoxy resin activities not specifically located in other sections. He is succeeded by **A. A. Hill.**

Stanley F. Roth named section head—package section, replacing **F. R. Lehman** who has been assigned to a project position as plastics sales supv. with **Dow Chemical Co. (U. K.) Ltd.**

Dow Chemical International Ltd. S. A.: Roe E. Withrow, Jr., appointed asst. to the pres.

The Dobeckmun Co. Div.: Nicholas R. Sheehan promoted from a product sales mgr. to the industrial sales div.

Rohm & Haas Co.: Following the death of **Otto Haas,** founder, chrmn. of the board, and pres., (see page 235), **Dr. Ralph Connor** was elected chrmn. of the board. He will continue as VP—research. **Dr. F. O. Haas,** formerly exec. VP becomes pres. and chrmn. of the exec. committee. **John C. Haas** elected v-chrmn. of the board.

Allied Chemical Corp.—Plastics & Coal Chemicals Div.: Paul E. Keitel named works mgr. of the div.'s Glendale plant, Toledo, Ohio.

Semet-Solvay Petrochemical Div.: Bennett D. Buckles appointed gen. mgr. **George Kazan Jr.** named dir.—commercial development, and **Damon A. Peterson** is dir.—operations.

National Aniline Div.: Charles D. Smith named prod. supt. of the Moundsville, W. Va. plant.

Formica Corp., a subsidiary of American Cyanamid Co., separated its national sales force into two distinct units. The decorative sales force will handle wall tile, Flakeboard, adhesives, and other service items used with the company's decorative laminates. Industrial grades of Formica, including copper-clad laminates and molded parts will be handled by a separate industrial sales force.

Ciba Co. Inc. established a **Pigments Div.** to handle a broad range of organic pigments, pigment dispersions, and soluble dyes for use in the plastics, coatings, and printing inks industries. The range of products available includes a number of specialties developed by the company. Administration, sales, and tech. activities of the new div. will

P. L. Penaud

H. G. Osolin

be located at Fair Lawn, N. J. **P. L. Penaud,** previously associated with Ciba's pigment activities in Western Europe, named mgr. **H. G. Osolin** heads the div.'s tech. activities. He was formerly in charge of the pigments application, tech. service, and control laboratories of **Ciba Ltd.,** Basle, Switzerland.

Monsanto Chemical Co.—Plastics Div., Springfield, Mass.: Full responsibility for product management, field operations, and tech. service functions have been integrated for the three groups administered by **Edwin L. Hobson,** dir. of sales—plastic products; **Chester L. Jones,** dir. of sales—resin products; and **J. Virgil Waggoner,** mgr. of sales—raw materials. Under the new organization, the div.'s dist. sales offices in New York, N. Y., Chicago, Ill., and New England (Springfield, Mass.), will operate under dual dist. management with one marketing group handling plastic products, the other resin products. The Cleveland, Ohio and St. Louis, Mo. sales offices become plastic products offices, and the Detroit, Mich. office handles resin products. The Los Angeles, Calif. and Seattle, Wash. sales offices will continue handling all divisional products. The Charlotte, N. C. office will be discontinued.

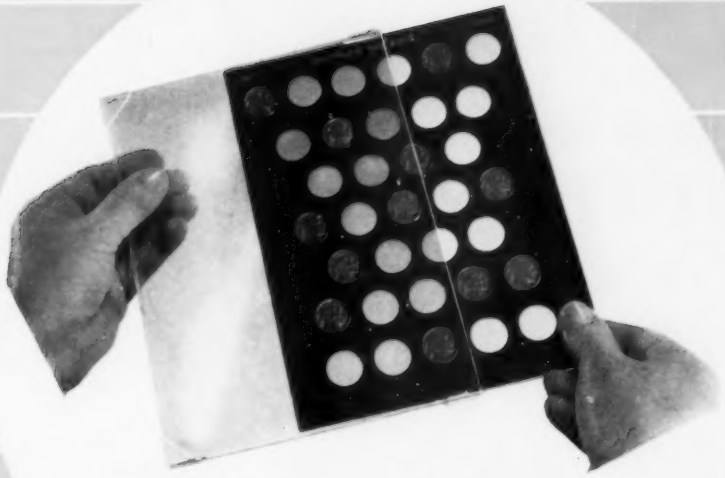
The following realignment of personnel responsibilities has been made to implement the new organization of the dept.:

Staff group: James P. Skehan, former dir. of field operations, made dir. of sales—customer relations. **Richard M. Thews,** moved from asst. product sales mgr., Lustrex molding materials, to mgr.—sales training. **Thomas J. Martin,** previously industrial and bldg. applications group, now coordinator of customer visits. **George D. Jefferson** moved to market development rep.

Plastic products group: C. F. Trombley, formerly dist. sales mgr. New York, now mgr.—field operations, Springfield. **David Guarnaccia,** former product sales mgr.—Lustrex molding materials, becomes dist. sales mgr.—plastic products, New York. **Paul Stahlberg** moved from tech. service mgr., polyethylene, to replace Guarnaccia. **Eli A. Haddad,** formerly asst. dir.—tech. service, now mgr. **Edward R. Tolles** now product sales mgr.—Vuepak and specialty products. **Robert W. Riedel,** formerly product sales mgr.—Ultron film and Vuepak, becomes dist. sales mgr., plastic products, New England. **Daniel R. Goodfellow, Gerald J. Marceau,** and **Jack W. Porte,** dist. mgrs. for the Cleveland, Chicago, and St. Louis offices respectively, assume responsibilities for plastic products. **James H. Watt,** former dist. sales mgr., Los Angeles, now responsible for plastic and resin products.

Charles E. Hamlin, phonograph record specialist, now tech. service mgr.—vinyl resins and compounds. **Thomas A. DeMarco,** formerly mgr.—industrial and bldg. applications group, is now tech. service mgr.—record materials. **Robert A. McCarthy** changed over from Lustrex tech. service to tech. service mgr., polyethylene. **William E. Wiese,** formerly coordinator of customer visits, now asst. product sales mgr., Saflex. **Kenneth L. MacIsaac,** previously asst. dist. mgr., New England, now asst. product sales mgr., vinyl resins and compounds. **Walter Agurkis** transferred from dist. mgr., Charlotte, N.C., to sales rep. St. Louis. **Prescott Coan,** who was with the industrial and building applications group, now tech. service rep.—Lustrex. **Albert J. Benjamin** transferred from the same group to tech. service rep., Saflex, and **Edward A. Nelson** transfers to color service, Lustrex.

Resin products group: Theodore J. Haselton, former service mgr., Opalon, becomes mgr.—field operations. **Robert R. Moyer** promoted from asst. dir. to mgr. of tech. service. **A. L. Bonutto,** dist. sales mgr., Seattle, continues to be responsible for resin and plastic products. **Ralph W. Rohlfing** moved from asst. product mgr., Opalon, to dist. sales mgr., resin products, New York. **Winston R. Richter, Robert R. Wilson,** and **Wilbur M. Swan,** dist. sales mgrs., New England, Detroit, and Chicago, assume responsi- **(To page 238)**



One way to handle money easily is with this clever protector for coin collectors. Fashioned of two pieces of molded styrene plastic—with protective corners—the coins are embedded in die-cut cardboard holders and then slid between the transparent plastic covers. Just another illustration of Makray molding ability.

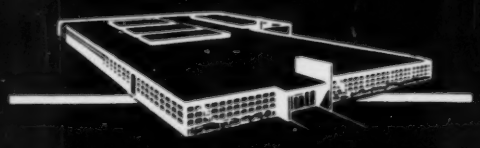
YOU'RE NOT GETTING ALL YOU PAY FOR IF YOUR *plastic* PRODUCTS DON'T HAVE THE

MAKRAY *ok*

If yours is a cost-conscious operation, if it's important to trim the fat off every production dollar, then the Makray "OK" has even greater meaning for you. Where competition is keenest, where profits are squeezed the hardest, that's where it pays off most. You get a plastic product that looks better, works better, and even sells better.

- **24 hour operation with strict adherence to delivery schedules.**
- **30 latest Hi-speed presses with 8 to 60 oz. capacities to handle any size job efficiently and economically.**
- **Molds designed and built in our own shop plus complete engineering service.**

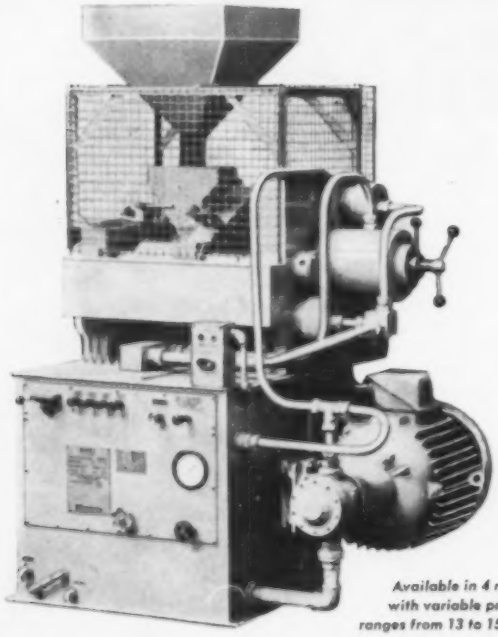
Give your plastic products the edge. Call or write for information on the Makray "OK" . . . today!



MAKRAY MANUFACTURING COMPANY
4400 NORTH HARLEM AVENUE
CHICAGO 31, ILL. • GLadstone 6-7100

BIPEL PREFORMERS:

NOW THE PACESETTERS!



Available in 4 models with variable pressure ranges from 13 to 155 tons

BIPEL Preformers . . . the accepted standard of the thermosetting-plastics industry! Small wonder, because these husky units produce more uniform preforms faster . . . yet with a controlled **hydraulic** action. Far lower in cost, too, both initially and for maintenance!

New special designs have increased production rates even further. For example, one firm requiring 2¼" dia., .150 lb. preforms from agitator-type materials is producing 3100 per hour compared to the previous rate of 1900 . . . with total weight variation only slightly over 1%. Why not send us **your** special requirements.

Demonstrations and Services at Tiverton

B. I. P. ENGINEERING LTD. Sutton Coldfield, England
JOHN SPERLING & CO., 739 Mountain St., Montreal 3, Que.

RALPH B. SYMONS ASSOC.

BIPEL®
COMPRESSION - TRANSFER PRESSES
HORIZONTAL HYDRAULIC PREFORMERS

3571 MAIN RD.
TIVERTON, R. I.

COMPANIES...PEOPLE

(From page 236)

bility for resin products. **George C. Schmidt,** former asst. dist. mgr., Detroit, now asst. product sales mgr., surface coatings in Springfield.

Raw materials group: James N. Flanagan, formerly adm. asst., now asst. sales mgr., raw materials, at Texas City, Texas. **Roy T. Cowing,** previously dist. sales mgr., Charlotte, now responsible for raw materials sales Eastern dist. **Richard M. England** transferred from asst. dist. sales mgr., New York, to be responsible for raw materials sales, Central dist. **Kenneth L. Hanson** joined the research dept., and **Robert D. Lloyd** the engineering dept. at Springfield.

Organic Chemicals Div.: Dr. John R. Durland, formerly tech. prod. mgr., named product dir. for plasticizers, resins, and paper chemicals.

Overseas Div.: Harold W. Mohrman, promoted from dir. of research —associated interests for the company's Plastics Div., to newly created post of dir. of research of the Overseas Div.

Hercules Powder Co.—Synthetics Dept.: **Donald H. Sheffield** appointed gen. mgr. of the dept. succeeding **Henry A. Thouron.**

International Dept.: Henry A. Thouron named gen. mgr. of this newly created dept. **William L. Cahall** is dir.—sales. The following were named dir. of development and operations: **Warren F. Beasley**—Western hemisphere; **Harvey J. Taufen**—Far East; and **Henry Reeves Jr.**—Europe.

Wyandotte Chemicals Corp., M. A. Div.: Richard E. Gromacki named asst. mgr.—urethanes. **John Arble** becomes tech. rep. for the new products dept. Both were previously in the Research Div.

H. B. Fuller Co.: E. A. Vigard, formerly VP and gen. mgr., **H. B. Fuller Minnesota Co.,** named VP of the adhesives div., of the parent **H. B. Fuller Co.** He succeeds **George L. Ryberg,** VP and gen. mgr., **H. B. Fuller Co. of Missouri. R. E. Foley** succeeds Mr. Ryberg. **James Watt, H. B. Fuller Co. of California,** joins the St. Paul, Minn. home office as mgr. tech. service adhesives div.

The Thermocote Co., 108 S. DeLacey Ave., Pasadena, Calif., is now casting clear polyester sheets in all thicknesses up to ½ inch. The company will forward specification properties of its sheets together with prices.

Texas Butadiene & Chemical Corp.: W. C. Franklin, previously asst. sales mgr. of TB&C, named mgr. of the newly organized **Polychemicals Dept.** which will be responsible for application research, market development, and sales of **(To page 240)**

Naugatuck MARVINOL

widest, most complete line in the industry!

Plastisols—Naugatuck's group of dispersion-grade resins is without peer in the industry. Marvinol® resins for high-shear applications offer the lowest viscosity available anywhere. Other resins for low-shear applications couple extremely low viscosity with excellent air release. Their range of outstanding properties has made Marvinol plastisols Naugatuck's fastest-growing family group.

Cold dry blends—Since its introduction of the first homopolymers with high oil absorption in unheated mixers, Naugatuck has been a leader in this field. It now offers the widest range of resins available—covering the widest range of processing conditions.

Hot dry blends—Naugatuck has now extended the line to include the lowest molecular weights in the business. The higher weight resins are particularly noted for their excellent electrical properties.

Specialties—Long-proved VR-10 and VR-12 are the highest molecular-weight resins of their type produced in this country. They combine high weight, resulting good physicals, and processability as no other resins. Ideal for rigid compounds, they are also frequently used as low-cost partial replacements for dispersion-grade resins, and are particularly valuable for the exceptionally dry hand they impart to plastisols or any vinyl product.

Copolymer—Excellent processability at very low temperatures, good heat and light stability with the usual stabilizers, and excellent filler tolerance are features of Naugatuck's resin designed for such applications as phonograph records and asbestos floor tile. Though but recently introduced, this resin is already enjoying widespread approval.

If it's vinyl you want, Naugatuck has it... more and better.

United States Rubber
Naugatuck Chemical Division
215 M ELM STREET
NAUGATUCK, CONNECTICUT

KRALASTIC RUBBER-RESINS • **MARVINOL** VINYLS • **VIBRIN** POLYESTERS

Akron · Boston · Gastonia · Chicago · Los Angeles · Memphis · New York · Phila. · CANADA: Naugatuck Chemicals · Elmira, Ont. · Cable: Rubexport, N.Y.

Save on Plastics!...
(Raw Materials)

WOLOCH offers *complete* service at the *lowest rates* in the Thermoplastic field. This centralization enables you to fill *all* your plastic needs from one quality source, while effecting considerable savings in processing and materials. Try WOLOCH when placing your next order. You'll be glad you did!

For your convenience, an outline of WOLOCH services:

Woloch *Buys and Sells:*

Virgin and Reprocessed Polyethylene: Low, Intermediate and High Density.
Polystyrene: Crystal Clear, Colors, High Impact in Natural and Colors.
Nylon: Reprocessed Pellets in Natural, Black and Colors.
Vinyl: Virgin Resins.
Scrap Plastics and Off-Specification Resins: all materials and qualities.
Surplus inventories of Thermoplastic materials.
Our large inventory of all materials assures *speedy* delivery.

Woloch *Custom Compounds:*

- Our modern Custom Compounding Department is widely noted for accomplishing the difficult.
- Painstaking care is always taken to formulate orders to your *exact* specifications.
- Rigid quality control assures absolute uniformity of pellets, cleanliness and color.
- We will work with your material or ours.

george Woloch CO., INC.

514 West 24th Street, New York 11, New York
Cable Address: Geowoloch, New York
Offices & Warehouses:
New York Newark Jersey City Akron

At Woloch, personal service is our byword ... customer savings our aim.

COMPANIES...PEOPLE

(*From page 238*)

polymers, copolymers, and other types of polychemicals which the company has under development.

R. M. McFarland, formerly with Food Machinery & Chemical Corp., joined as mgr.—market development. **J. C. French**, previously with American Cyanamid Co., joined the market research dept. and will be in charge of this function for the Polychemicals Dept.

Mount Hope Machinery Co., Taunton, Mass.: **Homi Kapadia** named dir. of overseas marketing. **Herbert J. Akerblom** named Canadian rep. The company manufactures specialty machinery for handling webs of plastics, paper and textiles.

Continental-Diamond Fibre Corp., a subsidiary of **The Budd Co.**: **Arthur J. Briggs** promoted from VP-sales to VP-marketing, with complete charge of CDF's sales and marketing functions. **Harold Moyer** promoted from mgr.—Philadelphia, Pa. dist. office to field sales mgr.

Heyden Newport Chemical Corp.—Heyden Chemical Div.: **David X. Klein** promoted from tech. dir. to div. VP.

American Plastics Corp., a subsidiary of Heyden Newport: **John A. Parsons** promoted from exec. VP to pres. **Elmer G. Smith**, previously a VP, succeeds Mr. Parsons.

Enjay Co.: **Arnold C. Matthies** returned from an overseas assignment with **Esso Export Corp.** to resume his post as product mgr.—chemicals.

Plastics Div.: **David R. Hammel** named tech. coordinator and **Frederick T. Philips** is mfg. coordinator.

Packaging Institute Inc.: **W. B. Tibbets, Union Carbide Corp.**, elected chrmn. of the Tech. Coordinating Board, formerly known as the Tech. Operations Committee. The following were elected chrmn. of div. tech. committees: **Stanton D. Smith, The Dow Chemical Co.**—materials; **R. J. Hennessy, Lederle Laboratories**—product; **I. G. Nichol, Morningstar-Paisley Inc.**,—production; **Ernest A. Green, Interchemical Corp.**,—printed packaging; and **Ira Gottscho, Adolph Gottscho Inc.**—machinery.

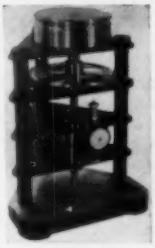
Metasap Chemical Co., formerly a subsidiary of **Nopco Chemical Co.**, is now a div. of Nopco. **Tom Campbell** continues to head Metasap as mgr. of the new div.

Cadillac Plastic & Chemical Co.: **Richard S. Carr** named Western product sales mgr. responsible for sales and distribution of all Cadco products west of the Mississippi. **Philip G. Rath** promoted from rep. in charge of the Akron, Ohio sales

CUSTOM WORK

SERVICE ENGINEERING

INSTRUMENTS & EQUIPMENT



Armstrong Indentation Machine

Additional Information or Catalog upon Request

CUSTOM SCIENTIFIC INSTRUMENTS, INC.
541 Devon St. Kearny, N. J.

SPI Flammability Tester

Armstrong Abrader

they COME OUT PRINTED by this

APEX AUTOMATIC

Print one or two color decorations, trade marks, illustrations on almost any surface – plastic, glass, metal, wood, cardboard, etc. Automatic hopper feed and conveyor take-off. No skill required to operate! 2500 pieces per hour. Prints one or more lines at the same time on a portion of, or the complete surface. Rapidly adjustable to different sizes. Special machines to order.

Send for illustrated bulletin and samples of work!

APEX MACHINE COMPANY
14-13 118th St., College Point 56, N.Y.

OVER 40 STANDARD DECORATING & MARKING MACHINES
In America's Largest and Most Complete Selection

office to Akron branch mgr. Cadillac recently purchased the Akron warehouse and inventory of **Plastics Mfg. & Supply Corp.**, Cleveland, Ohio.

The Detroit Rubber & Plastics Group Inc.: Officers installed for 1960 are chrmn., **Walton D. Wilson, R. T. Vanderbilt Co.**; v-chrmn., **S. Miller Sidwell, Chrysler Corp.**; secy., **Richard W. Malcomson, E. I. du Pont de Nemours & Co.**; and treas., **Phillip V. Millard, Automotive Rubber Co.**

Arvin Industries Inc., Columbus, Ind.: **Robert V. Wearne** and **William G. Yeager** named regional mgrs.—architectural products div., Mr. Wearne will be in charge of Arvinyl vinyl-metal laminate wall materials sales in Ind., Wis., Mich., Ohio, and Tenn. Mr. Yeager will have the same duties in the area west of the Mississippi river and in western Canada.

Vinylux Ceiling Div., Sealview Plastics Inc. has been acquired by **Hugh H. Aiken,** formerly VP of Sealview, and now pres. of **Diffusa-Lite Co.** The national sales office, as well as expanded mfg. facilities for luminous ceilings and skylights are now located at Conshohocken, Pa.

U. S. Tariff Commission: Frank Gonet, the commission's expert on coal-tar intermediates and dyes, named chief of the Chemical Div. **Thomas J. Scott,** the commission's expert on petroleum, assumes additional duties as asst. chief. The Chemical Div. prepares the commission's annual report on *Imports of Coal-Tar Products* and the preliminary and annual reports on *Synthetic Organic Chemicals, U. S. Production and Sales*

Roger Williams Technical & Economic Services Inc., Princeton, N. J. chemical market research organization, acquired the British consulting firm of **George Levi & Partners**, London, England. **Terrence D. O'Keeffe,** executive partner of the Levi organization appointed VP and European mgr. of the Williams firm.

National Polychemicals Inc., Wilmington, Mass., mfrs. of plasticizers: **John C. Haughey** named mgr.—Midwestern sales. **Norman W. Torgersen** named New England area rep. **John C. Blackwood** appointed mgr.—Eastern sales. **Francis X. O'Keefe,** former adm. asst., is sales coordinator.

Hungerford Plastics Corp., Morristown, N. J.: **Jack Sandler**, formerly VP—Injection Molding Dept., promoted to sr. VP. **Arne Osth,** formerly VP—production, now VP—engineering. Mr. Osth recently returned from one year's leave of absence spent in Europe studying new designs and plastic processes. **Ake V. Ljung,** formerly prod. mgr.—Rotary Div., is now VP—production. **Donald P. Arrowsmith** promoted from sales mgr.—consumer products to VP—sales.

American Chemical Corp., producer of PVC resins, established headquarters in the company's newly completed office building at 2112 E. 223rd St., Long Beach, Calif.

The Technical Assn. of the Pulp & Paper Industry (TAPPI) moved from 155 E. 44th St., to new and expanded quarters at 360 Lexington Ave., New York, N. Y.

Rogers Corp., Rogers, Conn., **Killingly Div.: George P. Archer** named mgr.; **Roy A. Rosen** appointed chief tool and die engineer. **Lee Hennessy** is market development engineer.

U. S. Polymeric Chemicals Inc.: William S. Thornhill elected exec. VP. He was formerly VP and secy. **Howard T. Cusic,** formerly sales mgr. of the Eastern div., elected a VP.

Plax Corp.: Richard J. Morcom, formerly an asst. research mgr., appointed mgr. tech. service, Film and Sheet Sales Div. **Lawrence D. Barr** and **Merlin L. Evans** named section supvs.—R & D dept. **John Carlile** responsible for man- **(To page 242)**

Stands out as a reliable manufacturing source for expandable polystyrene beads...

UNITED'S
UNI-CREST
EXPANDED POLYSTYRENE

Regular or self-extinguishing type beads available for prompt shipment. Write for free sample.

Uni-Crest Division
UNITED CORK COMPANIES
28 Central Avenue, Kearny, New Jersey

COMPANIES...PEOPLE

(*From page 241*)

agement of the company's new folding tray and box marketing program, involving the use of Polyflex, biaxially oriented polystyrene sheet. **Roger J. Chamberland** succeeds Carlile as mgr.—marketing admin.

Vanguard Plastics Inc. moved from 41 E. Main St. into its new plant at 29 Bannard St., Freehold, N. J. The company produces stock detergent style blow-molded bottles, ranging in size from 12-oz. to 1 gal.

Ludlow Papers Inc., Plastics Div., Needham Heights, Mass.: **Edward J. Gillespie** appointed dist. sales mgr. for the company's line of cast films in the Midwest, and **Robert G. Heidenreich** as a Midwestern sales rep.

Donald G. Patterson named VP—plastics, by **Reichhold Chemicals Inc.** With the company for the past eight years, Mr. Patterson was appointed mgr. of the **Plastics Div.** when it was formed early in 1959. In his new position he will retain responsibility for all RCI activities in the plastics area, including resins for adhesives, laminating, casting and molding, but with the exception of phenolics.

D. G. Patterson

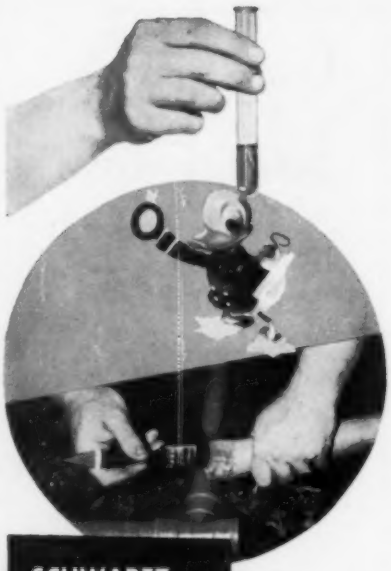
James R. Turnbull, consultant in marketing, management, and product development for the plastics industry, joined **DeBell & Richardson Inc.,** consulting engineers, Hazardville, Conn. He was formerly sales mgr. of Monsanto Chemical Co. Plastic Div., and recently VP of Mitsubishi-Monsanto Chemical Co.

August Napravnik named VP in charge of production for **Catalin Corp. of America.** Now responsible for all phases of production and mfg. at all Catalin plants, he has been with the firm since 1939. His most recent post was production mgr. and, prior to that as head of the firm's New Products Div., he was instrumental in the establishment of Catalin Corporation's **Chemical Div.**

A. Napravnik

Dr. John F. O'Donnell appointed dir. of commercial development, **Kordite Corp.,** Macedon, N. Y.

Charles E. Bulloch appointed field sales specialist for the electrical and electronics industries by the reinforced plastics div. of **A. O. Smith Corp.,** Milwaukee, Wis. His major function will be the development of



SCHWARTZ RESEARCH
...the difference in adhesives for plastics

From heavy industrial needs all the way to delicate decorations — from toys to jet engine parts — Schwartz Chemical Co. manufactures quality adhesives created specifically for bonding either similar plastics, dissimilar plastics or plastics to non-plastics.

Producers of VC-2, REZ-N-GLUE, REZ-N-BOND and dozens of other adhesives for special plastic applications, Schwartz is universally recognized as one of the reliable names in the industry.

For any plastic problem contact Schwartz Chemical Co. There's no obligation. Solving the problems is an integral part of our service.

Serving the needs of the plastic industry
schwartz
CHEMICAL CO., INC.
50th Ave. — 2nd St.
Long Island City, N. Y. ST 4-7592
MANUFACTURERS OF DYES—LACQUERS—
CLEANERS—ADHESIVES— FOR PLASTICS

applications of the company's Red Thread glass fiber pipe, tubing, and other shapes for the electrical and electronics industries.

Bruce Ainsworth, formerly asst. to **Charles H. Rybolt**, VP in charge of chemical divisions for **Wallace & Tiernan Inc.**, named pres. of the Harchem Div. He will be responsible for all division activities including research, product development, production, and sales. He came to Wallace & Tiernan from Celanese Corp. of America.

B. Ainsworth

Frank E. Seborowsky, formerly with Celanese Corp. of America, appointed gen. mgr. of **Chanal Plastics Corp.**, Rego Park, N. Y. The company recently formed a blow molding div. to produce custom industrial parts, packaging, etc.

Thomas P. Murphy named development mgr. for **Fiberfil Inc.**, Warsaw, Ind. producer of glass reinforced molding compounds.

Charles E. Rank elected exec. VP of **Harry Davies Molding Co.**, Chicago, Ill. He also continues as gen. mgr.

Jean F. Malone appointed sales development mgr. of plastics materials for **B. F. Goodrich Chemical Co.** He will direct sales and technical activities associated with the introduction and establishment of new plastics materials. He replaces **William E. Manring**, who recently resigned. Mr. Malone joined the company as a jr. engineer in 1946 and became a sr. product engineer in 1952 in the plastics materials sales dept.

J. F. Malone

Henry B. Puff named mgr.—field sales, **Durez Plastics Div., Hooker Chemical Corp. Richard W. More** succeeds Mr. Puff as asst. product mgr.—resins.

Edwin S. Flinn elected exec. VP of **Hurlbut Paper Co.**, South Lee, Mass., producers of technical papers for the decorative and industrial laminating industries. He assumed the duties of the chief exec. officer upon the retirement of **E. A. Sitzer**, pres.

Walter R. Hallas named East Coast tech. rep. for **Ren Plastics Inc.**, Lansing, Mich. formulator of epoxy resins for tools and tooling. His headquarters are at 135 Harding Ave., Newington, Conn.

Dr. Sivert N. Glarum joined the staff of **Southern Research Institute** as asst. head of **(To page 244)**

Now FREEMAN adds a complete line of ISOPHTHALIC STYPOL POLYESTER RESINS

MATCHED DIE QUALITIES

increased physicals
high filler capacity
excellent flow
fast cure

HAND LAY-UP OR SPRAY-UP QUALITIES

excellent wetting
fast cure
high impact strength
high wet strength

PREMIX QUALITIES

fast cure
craze resistance
high impact strength
good chemical resistance

Freeman continues to tailor-make resins for your particular application. Our greatly expanded production capacity and sales and advisory staff stand ready to serve you. Call on us.

FREEMAN CHEMICAL CORPORATION

PORT WASHINGTON • WISCONSIN
AMBRIDGE • PENNSYLVANIA

a subsidiary of H. H. Robertson Company

STYPOL POLYESTERS • CHEMPOL ALKYDS • URETHANE RESINS • COPPER POWDER ADHESIVES • FOUNDRY RESINS • BITUMINOUS COMPOUNDS • PVA VEHICLES

Add New Sparkle to YOUR Product!

SELF-ADHERING
MIRRO-BRITE
METALIZED
MYLAR*

LOOKS AND LASTS LIKE METAL!

There are countless ways that you can use MIRRO-BRITE metalized "Mylar" . . . and at little cost. Choose from a large assortment of colors in plain or embossed patterns with pressure sensitive adhesive backing.

MIRRO-BRITE is available in continuous rolls, cut-to-sheet sizes or die-cut to any shape you require for simple application.

Our skilled specialists will be happy to consult with you with no cost or obligation.

*Mylar - Dupont Polyester Film

Write for actual samples and prices.

COATING
PRODUCTS, INC.
DEPT. MP, 101 W. FOREST AVE. ENGLEWOOD, N.J.

PIONEERS in METALLIZED MATERIALS!
Manufacturers of Mirro-Brite "Mylar," Acetate, Polystyrene and Butyrate.

COMPANIES...PEOPLE

(From page 243)

the Applied Chemistry Div. and will be concerned with plastics and textile chemicals. He was formerly chief chemist with Ciba Co. Inc.

Zane G. Cole named pres. of **Electric Mfg. Co.**, San Francisco, Calif., a div. of **Amerace Corp.** He succeeds **E. L. Danielson** who retired.

Electric is a molder of telephone dials, business machine keys, automobile control panels, etc.

Lawrence H. Stone named Midwest sales rep. of **Harte & Co. Inc.**, New York, N. Y. mfr. of vinyl fabrics. He will work out of Chicago, Ill.

Milton T. Schimmel elected pres. of **Decorative Engineering & Supply Inc.**, Gardena, Calif. The company designs and makes electroformed masks and fixtures for production painting, particularly of plastics, and provides engineering services for planning production spray painting.

Joseph D. Dreyfuss, previously merchandising head of the plastic div. of M. Lowenstein & Sons Inc., joined **Imperial Chemical & Plastics Corp.**, New York, N. Y., as dir.—marketing and merchandising.

Dr. Eric M. Hunt resigned from Shell Chemical Co. Ltd, England, to join the board of **Utilex Ltd.**, Kingston-on-Thames, mfr. of plastics films.

John A. Royal appointed mgr. of vulcanized fiber sales by **Taylor Fibre Co.**, Norristown, Pa. He will continue as mgr. of foreign sales, a position he has held since he joined the company in 1949.

George P. Kern appointed to a post in the Planning Div. of the **Special Products Marketing Dept., The Garlock Packaging Co.**, Camden, N. J.

Robert D. Forger appointed adm. asst. on the National Office staff of the **Society of Plastics Engineers Inc.**

Frederick A. Kroll named plant engineer at **Watertown Mfg. Co.**, Watertown, Conn. custom molders.

C. J. Schmidt, exec. VP of the **J. O. Ross Engineering Div., Midland-Ross Corp.**, named VP of the corporation.

Duane H. Eckdahl joined the **Organic Chemicals Dept.** of **Food Machinery & Chemical Corp.** as adm. asst. to **A. T. Loeffler**, dept. mgr. and FMC VP. This FMC dept. is made up of the Chemicals & Plastics, and Niagara Chemical Divs.

Henry W. Cox appointed sales supv. by **A. H. Wirz Inc.**, Chester, Pa. The new position was created in view of the company's expanding operations

From Slip to Static...
plastic problems are solved with
EZE
ADDITIVES
proven effective for...
Vinyl · Polyethylene · Nylon

STAT-EZE
On Nylon, Synthetic and Wool Carpeting...
STAT-EZE overcomes the annoyance of static accumulation and resoiling problems. It is easy to apply by spraying, sponging or immersion. It is tenacious and hard to rub off...STAT-EZE reduces the static charge on undergarments, upholstery materials and dresses made from synthetic fibres.

SLIP-EZE
For Polyethylene
extrusions and moldings... wherever quality specifications require precise slip and reduced static charges. An unusual lubricant that improves production speeds ...SLIP-EZE gives your product an attractive gloss... without discoloration or a greasy feel. FDA approved.

VYN-EZE
For Vinyl
films and sheeting...to significantly reduce tack and block. You can achieve greater efficiency and speed in the winding, handling and converting of vinyls. VYN-EZE will give you a new standard for improved tack and clarity. FDA approved.

Write for prices, and technical information

FINE ORGANICS, INC.
Lodi, New Jersey

Headquarters for custom synthesis; bench, pilot, and production scale.

into many additional areas of packaging manufacture including plastics bottles, tubes, aerosol containers, and other plastics specialty items.

C. W. Kendall, sales engineer of **Reed-Prentice, Div. of Package Machinery Co.** in the company's Buffalo, N. Y. office, will now handle all sales and service of the company's injection molding machines and die casting machines in Canada.

J. L. Whitney appointed sales-service engineer by **Marbon Chemical Div., Borg-Warner**, Washington, W. Va.

A. S. Houston appointed Midwest sales mgr. for **National Packaging Corp.**, Fort Wayne, Ind. mfr. of Pak-Apeal plastics trays. He will work out of the Chicago, Ill. office.

Walter E. Anderson appointed sales engineer of **Scott Testers Inc.**, Providence, R. I. mfr. of physical testing equipment for plastics and other basic industries. He will be responsible for sales throughout the continental United States.

William A. Jarvey named product mgr. of **Archer-Daniels-Midland Co.** vinyl plasticizer dept. He succeeds **Robert S. Mathews**, recently appointed mgr. of the Prochem div.

Carl Sweitzer promoted from production supv. to gen. foreman at the **Seiberling Rubber Co. Plastics Div.** plant, Newcomerstown, Ohio.

James J. Farley named a sales rep. by **Synthane Corp.**, Oaks, Pa. mfr. and fabricator of industrial laminated plastics. He will cover the mid-Atlantic states.

Don S. Catterson named to newly created position of asst. to the gen. mgr. of **Chemical Process Co.**, Redwood City, Calif. mfr. of ion-exchange and polyester resins and adhesives.

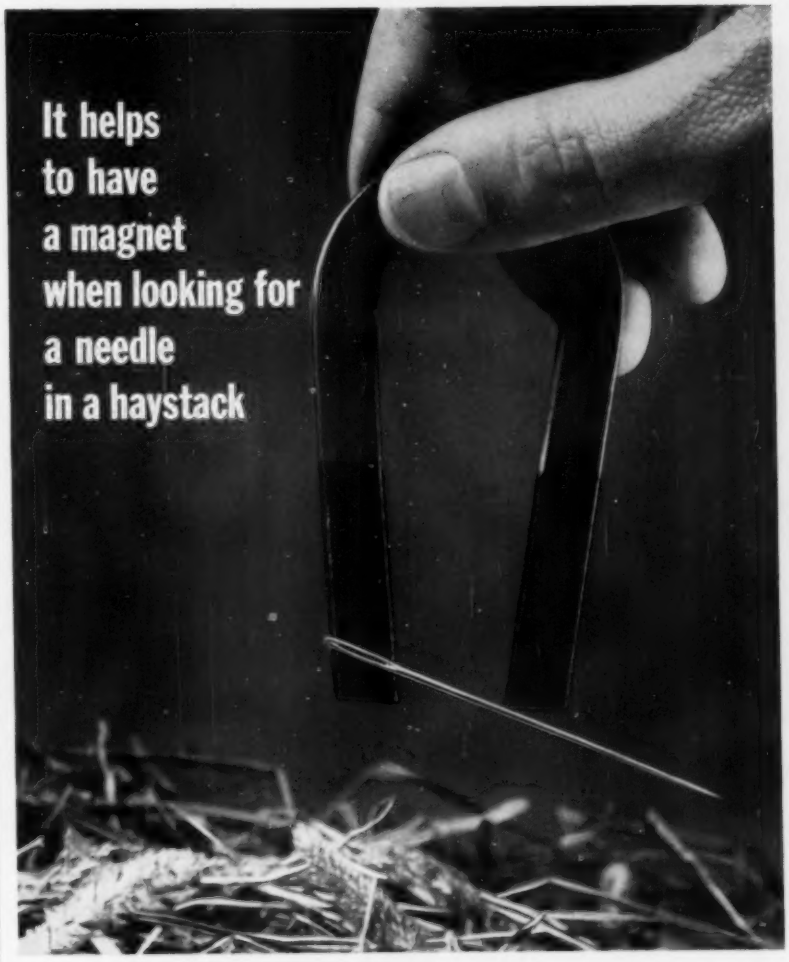
William M. Temple named mgr. of government sales for the Urethane Div., **The Dayton Rubber Co.**, Dayton, Ohio. He will locate at the company's new Washington, D. C. offices in the Mercury Bldg.

Maurice S. Letourneau promoted from New York to Eastern dist. sales mgr. for **Borden Chemical Co., Polyco-Monomer Dept.**

William J. Monahan named VP-sales for **Seamco Chemical Co.**, Holyoke, Mass. supplier of polystyrene.

Bill Whitney appointed Eastern sales engineer for the plastics line, which includes fluorocarbon and nylon rods and tubes, of **W. S. Shamban & Co.**, Culver City, Calif.

David W. Quinn joined the **Vulcan Rubber Products Div. of Reeves Brothers Inc.** as mgr. **(To page 246)**



Let GPU *Site-Service* find the right plant location for you!

GPU *Site-Service* is complete and confidential. As the one central source of plant location information for nearly half of Pennsylvania and New Jersey, it has full details about any of 1279 communities, large and small.

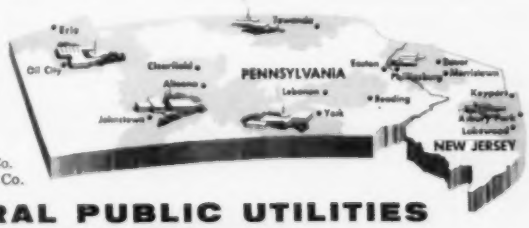
Its files contain more than 600 listings of available sites and buildings, ready to be matched to your requirements.

Contacting GPU *Site-Service* can be your first step toward location in one of the nation's finest industrial areas.

Wire, write or phone today. Your inquiry will receive prompt, *confidential* attention.

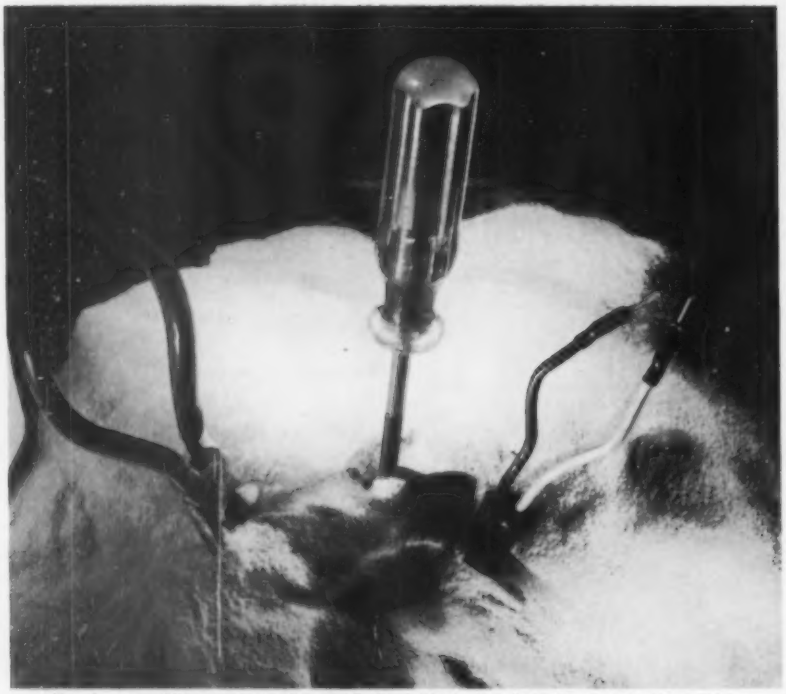
GPU ELECTRIC POWER COMPANIES

Metropolitan Edison Co.
Pennsylvania Electric Co.
New Jersey Power & Light Co.
Jersey Central Power & Light Co.



GENERAL PUBLIC UTILITIES CORPORATION

Att: Wm. J. Jamieson, Area Development Director, Dept. MP-1
67 Broad St., New York 4, N. Y. WHitehall 3-5600



For clear, sparkling products, this new Du Pont C/A is free from fibers and gel particles

FLAKED CELLULOSE ACETATE

from Du Pont for lacquers and molding powders

Here's a new Du Pont cellulose acetate. It leaves your formulations free from both fibers and gel particles.

Excellent clarity and sparkle. If appearance is important to your product, you'll like the way this new Du Pont C/A adds the clarity and sparkle of fine crystal.

Other properties. Du Pont C/A is tough. It has excellent light-stability characteristics, low flammability, excellent electrical resistance, good solubility. It goes into clear, water-white solutions rapidly. It's free from acidity.

Wide range. You can get this flake over an acetylation range from 52% to 56%, in viscosities stretching from 3 to 150 sec, Du Pont 20% viscosity.

Available in 60-lb. multiwall bags.

For information on pricing and shipping arrangements, call or write Du Pont, Explosives Department, 6539 Nemours Building, Wilmington 98, Delaware, or contact any of the offices listed below.

BRANCH OFFICES

BOSTON: 410 Federal Street, Room 325, Boston 10, Mass., Phone HAncock 6-1711; **CHARLOTTE:** 427 West Fourth Street, Charlotte 1, N. C., Phone FRanklin 5-5561; **CHICAGO:** 7250 North Cicero Avenue, Lincolnwood, Chicago 46, Ill., Phones INdependence 3-7250, ORchard 5-1010; **CLEVELAND:** 11900 Shaker Blvd., Cleveland 20, Ohio, Phone LOngacre 1-5070; **HOUSTON:** 3202 Weslayan Street, O'Meara Bldg., Houston, Texas; **LOS ANGELES:** 2930 East 44th St., Los Angeles 58, Calif., Phone LUdlow 2-6464; **NEW YORK:** 350 Fifth Avenue, 1000 Empire State Bldg., New York 1, N. Y., Phone LOngacre 3-6400.

DU PONT CELLULOSE ACETATE

DU PONT

REG. U.S. PAT. OFF.

Better Things for Better Living
. . . through Chemistry

COMPANIES...PEOPLE

(From page 245)

of the Grace plant near Rutherfordton, N. C. The plant will produce vinyl-coated fabrics. Its reactivation marks Reeves' entry into the vinyl coating field.

Alfred S. Backus elected VP-operations of the **Mycalex Corp. of America** and its affiliated companies, **Mycalex Electronics Corp., Mycalex Tube Socket Corp.**, and the **Synthetic Mica Co.**

Robert W. Shull named merchandising mgr. of **Lenox Plastics Inc.**, St. Louis, Mo. melamine dinnerware molding firm.

Reginald B. Stoops, engineering and marketing consultant, has moved his offices from 445 Park Ave., New York, N. Y., to 52 Hoyt St., Stamford, Conn. The new office location will include facilities for research and development work on plastics.

Julian C. Frankel appointed VP and gen. mgr. of **Velcro Sales Corp.**, New York, N. Y. mfr. of self-adhering nylon fasteners.

Stanley T. Bowden appointed sales mgr. of **Farrel - Birmingham Co. Inc., Watson - Stillman Press Div.**, Rochester, N. Y.

New reps.

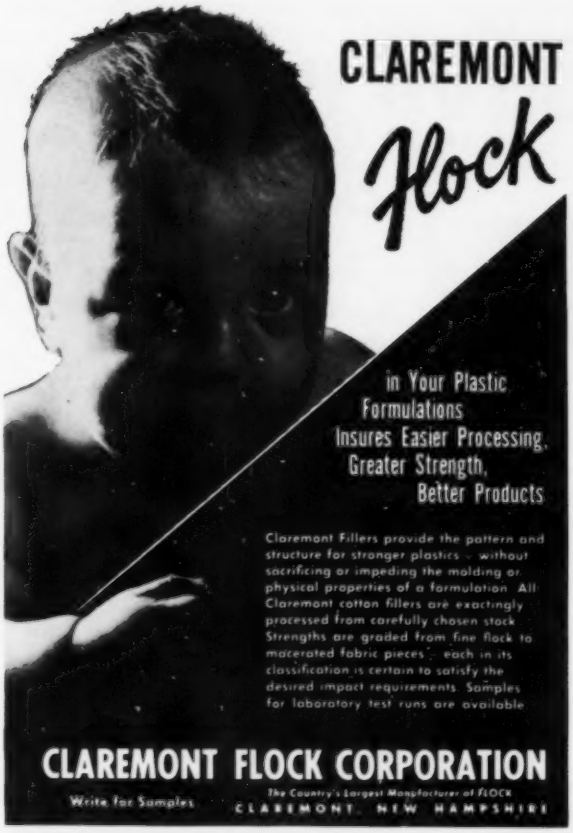
The Industrial Roll Div. of Rodney Hunt Machine Co., Orange, Mass., appointed as exclusive U. S. agents for **David Bentley Ltd.**, Manchester, England, mfr. of filled calender rolls used for super calendering, friction glazing, and embossing. . . . **Tafel Electric & Supply Co.**, 333 E. Brandeis St., Louisville 17, Ky., named as a distributor in the Louisville area of products manufactured by **Formica Corp., a subsidiary of American Cyanamid Co.** . . .

Ceragraphic Inc., 171 Newman St., Hackensack, N. J., color printers and silk screeners on plastics, glass, and metals, appointed **M. D. Gaffney Co.**, 4710 Crenshaw Blvd., Los Angeles, Calif. as West Coast rep., and **The Walter Frank Org.**, 4100 Warren Ave., Hillside, Ill. as Midwest rep. . . . **Chemicals & Pigments Corp.**, 227 California St., Newton 58, Mass., appointed as New England distributor of organic pigments and dyes manufactured by the **Dyestuff & Chemical Div., General Aniline & Film Corp.**

Corrections

Modern Plastics Encyclopedia Issue for 1960: p. 370. The correct address of **Merix Chemical Co.** is 2234 East 75th St., Chicago 49, Ill.

"Filament winding—some basic principles" (MPI, Dec. 1959, p. 116): Correct photo credit for picture at top of page is: Lamtex Industries, Inc.—**End**



CLAREMONT *Flock*

in Your Plastic Formulations Insures Easier Processing, Greater Strength, Better Products

Claremont Fillers provide the pattern and structure for stronger plastics - without sacrificing or impeding the molding or physical properties of a formulation. All Claremont cotton fillers are exactingly processed from carefully chosen stock. Strengths are graded from fine flock to macerated fabric pieces - each in its classification is certain to satisfy the desired impact requirements. Samples for laboratory test runs are available.

CLAREMONT FLOCK CORPORATION

Write for Samples

The Country's Largest Manufacturer of FLOCK

CLAREMONT, NEW HAMPSHIRE

THE

Di-Profiler RECIPROCATING HAND MACHINE

does your job faster

TIME-SAVING

VERSATILE

ADAPTABLE

For precision cutting, roughing, finishing of tools, dies, molds. For straight, or irregular surfaces, convex or concave curves—also shoulders, recesses and hard-to-get-at or intricate detail.

Saves hours of tedious hand labor in grinding, filing, scraping, honing or polishing. The reciprocating speed is variable from 0 to 100 strokes per second; and the stroke is adjustable from 0 to 6 mm. (¼ inch). Sturdily built, the Di-Profiler is light; free from vibration.

A complete assortment of efficient accessories and tools is available for every type of work: steel and diamond files, diamond discs, laps, hones, T-C scrapers; also rotary tools including diamond wheels, burrs and points.

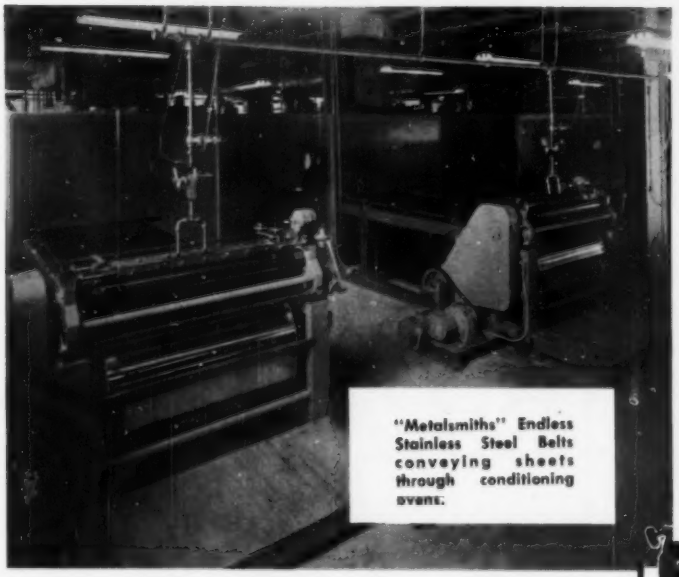
Investigate the Di-profiler —a minor investment that assures savings of time and costs. Ask for a demonstration or price list DK-20.

ENGIS EQUIPMENT COMPANY

Sole authorized distributor for the U.S.

431 S. DEARBORN ST., CHICAGO 3, ILL.

FLAT PRODUCTS fabricated in ONE Continuous Operation!



"Metalsmiths" Endless Stainless Steel Belts conveying sheets through conditioning ovens.

ENDLESS STAINLESS STEEL BELTS

speed production—cut costs of sheets, film, coatings, laminates, flooring, foam rubber, latex, etc.

Many advantages are gained by using "Metalsmiths" endless stainless belts in processing of plastic and rubber flat work. In one continuous operation, you improve and speed up heating—hot fusing—setting—curing—cooling—drying—finishing. Polished belt surface imparts an automatic contact gloss.

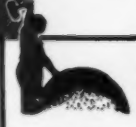
"Metalsmiths" has engineered and produced stainless steel belts for many leading processors. Consult our engineers on possibilities for your products, without obligation.

METALSMITHS

558 White Street, Orange, N. J.

WIDTHS UP TO 85"—ANY LENGTH

"Metalsmiths" (18-8) stainless steel belts are available in widths up to 58" in one piece without center seam; extra-wide sizes to 85" have longitudinal weld at center, finished to smooth, seamless working surface. High gloss or matte finishes.



METALSMITHS

STAINLESS STEEL

ENDLESS CONVEYOR BELTS

Want the "Specifics" on Plastics

MATERIALS METHODS MACHINES?

There's a chart, table or diagram in the new 1960 MODERN PLASTICS ENCYCLOPEDIA ISSUE to help you!

For example:

Technical Data Charts: A 64-page section of charts which list foams, adhesives, coatings, films, laminates, fibers and plasticizers.

Plastics Properties Charts: two wall charts which give detailed physical and chemical properties of 1) Thermoplastics and 2) Thermosets. Both cover molding and extrusion compounds, cast resins and sheet, rod and tube stock.

(All the above charts tell "who supplies what.")

Machinery Specification Charts: a new, 56-page section which provides instant comparison of the specifications of available injection and compression molding machines, sheet forming machines and extruding machines.

Polyethylene Resins and Their Uses: two pages of tables.

In addition, you'll find tables—by the dozen—"illustrating" articles throughout the Encyclopedia.

When you turn to your MODERN PLASTICS ENCYCLOPEDIA for information . . .

. . . turn to the section on Free Product Literature. It describes over 450 booklets and brochures supplied free by manufacturers. You simply order what you want on a prepaid, check-off post card.

. . . turn to the Buyers' Directory. It lists almost every type of product, machine or service used in the plastics field, tells who supplies it, and lists the pages of advertising containing additional helpful information.

. . . and turn to the dozens of excellent articles, covering every area of the plastics field, and presenting valuable "how-to" information.

HEAD

Color Development

CHEMIST

Prime manufacturer of polystyrene plastics requires experienced color man to head its color development group. Knowledge of pigments, dyes, dispersion problems and color evaluation as applied to plastics desirable.

Excellent potential with one of the leaders in the plastics industry.

Please write Personnel Department

Foster Grant Co., Inc.

Leominster, Mass.

Manufacturing Research

SUPERVISOR

(NON-METALLICS)

The fast-expanding Manufacturing Research and Processes Department of Republic Aviation Corporation has an immediate opening for a Supervisor of its Non-Metallics Section. Applicants must have experience in all phases of plastics, ceramics and other chemical responsibilities associated with our non-metallics section. Must possess a technical degree and ability to carry projects from conception thru production.

In addition to other advantages, Republic offers a comprehensive benefit program among the finest in industry.

Forward resumes in confidence to:
Mr. William Walsh
Employment Office

REPUBLIC AVIATION

Farmingdale, Long Island, New York

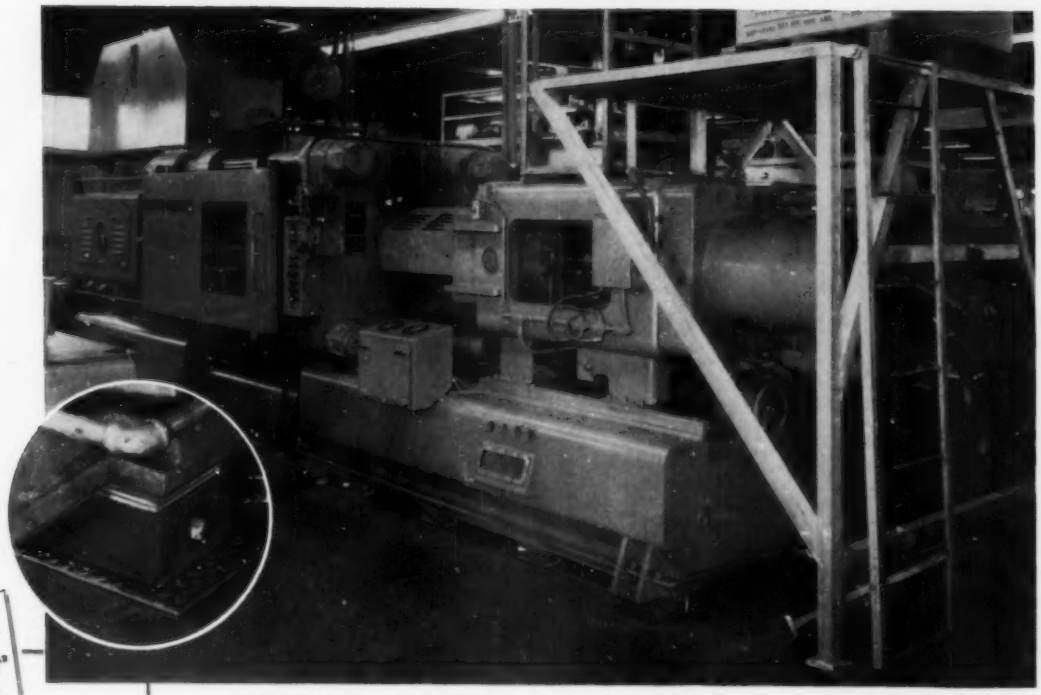
INJECTION MOLDING MACHINES

✓STAY LEVEL ✓STAY PUT

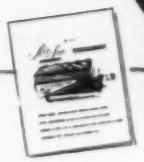
when you install them on the new

Air-Loc® 4-17-4 WEDGMOUNT

with patented vinyl, sisal, and cork Air-Loc top and bottom.



HPM #800 H-48 Injection Molding Machine installed on twenty WEDGMOUNTS Type S, each 1" x 8". Mounts were installed under the 87,000 lb. machine, adjusted to a level position, and machine is operating perfectly.



NEW FOLDER describes the WEDGMOUNT method, gives sizes available for various types of machines.

No more bolting machines to the floor, now you can have real production flexibility, plus the benefits of greatly reduced machine vibration. Look into WEDGMOUNT today. It is the fastest known method for precision installation of molding machines.

- **KEYED CONSTRUCTION** prevents movement within mount
- **DOUBLE-WEDGE CONSTRUCTION** gives immediate precision leveling
- **AIR-LOC TOP AND BOTTOM** grips machine to floor
- **ADJUSTMENT BOLT** permits fast, easy installation

Air-Loc® 4-17-4 WEDGMOUNT

is manufactured by

CLARK, CUTLER, McDERMOTT CO.

125 WEST CENTRAL STREET, FRANKLIN, MASS.

MICCROSOL

the finest in Vinyl Plastisols

- **WE SPECIALIZE . . .** *and in the areas where we specialize – WE'RE TOPS*

- **DIP — — SPRAY**

  If you're interested in coating your product with the outstanding plastisol in the industry . . . let our sales engineers work with you.

Our new laboratory building.

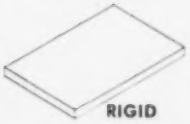
MICHIGAN CHROME and CHEMICAL CO.

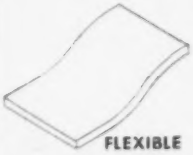
8615 GRINNELL AVE., DETROIT 13, MICHIGAN

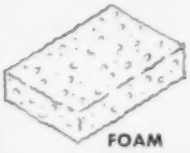
BEGINS WITH

SEALOMATIC

electronic heat sealing assures clean, permanent welds for all thermoplastics.







FOR EVERY REQUIREMENT

Sealomatic has available ½, 1, 2½, 3½, 5, 6kw and up to 30kw units in stock. In addition, automatic equipment such as, turntable models and indexers. Electrode preheating attachments for applique work. Also, self-contained hydraulically operated units that eliminate the need for air compressors. Whatever the unit—perfect results everytime.

DURABLE CONSTRUCTION

Sealomatic utilizes the highest quality electronic components, combined with a solid C-frame press to withstand the constant grind of daily production. The end result, an increase in production, years of dependable, trouble-free performance.

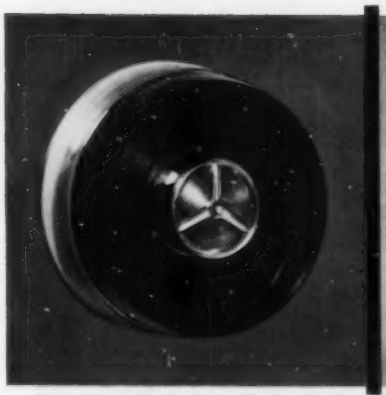
EASY TO OPERATE. All controls are within the reach of the operator. And, there's no unnecessary training period —immediate full production from new or unskilled workers. You pay for the machine out of the savings on labor and extra production.

Write or phone today for complete details on how Sealomatic can profit your operation.

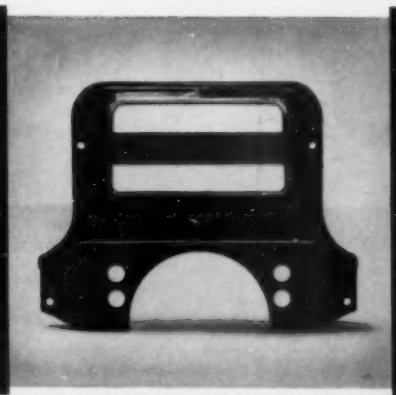
SEALOMATIC ELECTRONICS CORP.
Dept. M,
75 SCOTT AVE., BROOKLYN 37, N.Y.
Glenmore 6-8080
MONTREAL: 1362 JEAN TALON, CRESCENT 4-8274
REPRESENTATIVES IN ALL MAJOR CITIES AND MEXICO

The Automotive Market...
High style Mercury taillight lens is achieved through vacuum metallizing on second or inside surface.

Hit this New Sales Jackpot with VACUUM METALLIZING



Dramatic taillight lens of the Ford Thunderbird utilizes vacuum metallizing on inside surfaces.



Metal rim effect created through metallizing on instrument panel on Bonanza Airplane by Beechcraft made by metallizing.

New light weight metallized plastic arm rest on Pontiac, Buick and reflector on rear arm rest of Chevy's Impala, are less expensive than metal, look better.

Help Detroit win the battle against costs and weight and you'll bring home the sweetest slice of business you ever saw! And you can do it with vacuum metallized plastics!

Take a peek at the Mercury or Thunderbird taillights, the new arm rests for the Buick and Pontiac, or the smart backup plate on the Impala arm rest and see if these examples don't stimulate your imagination. It may also be worth your while to look over the instrument panel or aircraft interiors and chalk up another market with boundless opportunities for sales.

Best of all, you don't have to know anything about vacuum metallizing to get started. Buy the equipment from us; we will install it, train your operators, and help you set up a production operation.

Send us a sample part and we will finish it FREE. We will also estimate the cost per piece without obligation. Will you ship today?

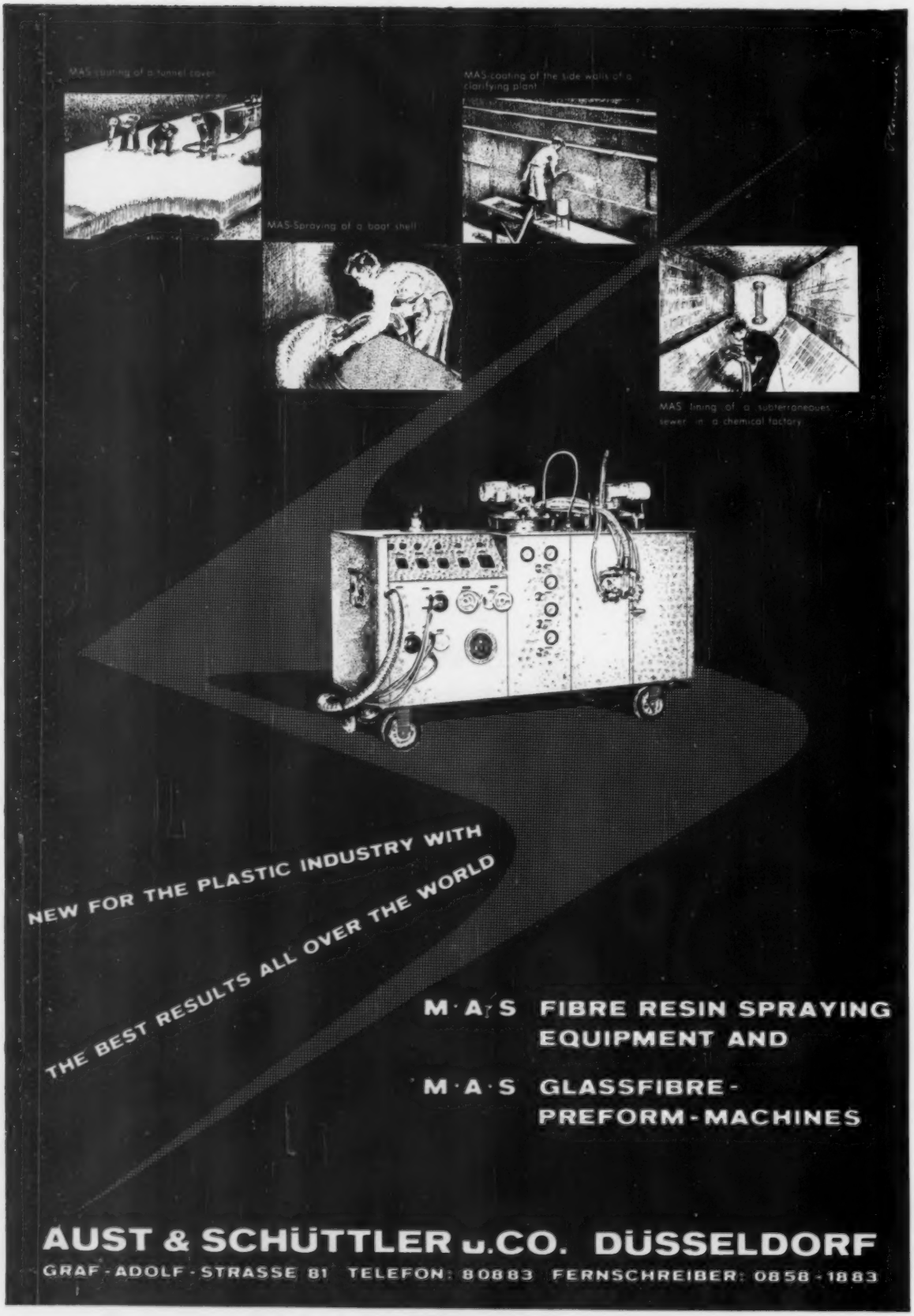
NRC

NRC

EQUIPMENT CORPORATION

A subsidiary of National Research Corporation
Dept. 19-N, 160 Charlemont Street,
Newton 61, Mass. DEcatur 2-5800

SALES OFFICES: Boston • Chicago • Cleveland • Detroit • Houston • Los Angeles • New York • Pittsburgh. West Coast: Palo Alto, California, DAvenport 6-3455


MAS-coating of a tunnel cover
MAS-coating of the side walls of a clarifying plant
MAS-Spraying of a boat shell
MAS lining of a subterraneous sewer in a chemical factory
NEW FOR THE PLASTIC INDUSTRY WITH
THE BEST RESULTS ALL OVER THE WORLD
M·A·S FIBRE RESIN SPRAYING EQUIPMENT AND
M·A·S GLASSFIBRE-PREFORM-MACHINES
AUST & SCHÜTTLER u.CO. DÜSSELDORF
GRAF-ADOLF-STRASSE 81 TELEFON: 80883 FERNSCHREIBER: 0858-1883

GERMANY

Representative for U.S.A., A.M.A.S., Inc., 18 Jackson Avenue Syosset, L.I., N.Y., Box 56

CLASSIFIED ADVERTISEMENTS

THE MARK OF QUALITY
BARBER COLMAN

Impressor

PORTABLE HARDNESS TESTER

- Rapid testing—no setup
- Easy to carry and use
- Needs only space for hand

A portable hardness tester for plastics, aluminum and alloys, and soft metals, the Barber-Colman Impressor is designed for fabricated parts and raw stock testing. Operating experience is not essential. The reading is instantly indicated on the convenient dial. No waiting, preloading, or separate measurements. Barber-Colman engineers will gladly recommend the most suitable model for your application. Write today for complete details.

BARBER-COLMAN COMPANY
Dept. C, 1217 Rock Street, Rockford, Illinois

for Pre-Planned
HIGH PRODUCTION PRODUCT FINISHING

Consult CM

★ Electro-formed nickel or copper MASKS for spray decorating of intricate areas in multiple colors, one wet coat after another.

★ A complete line of AUTOMATIC PAINTING MACHINES for every finishing requirement.

★ Mechanical and air operated clamps and pressure FIXTURES for holding parts and masks.

★ Automatic high pressure MASK WASHERS for doubling production.

"20 years of "know-how" are at your disposal. Write for brochure or send prints or sample parts, giving production requirements and results desired.

"CM Quality Tools Produce Quality Products"

Conforming Matrix
CORPORATION
364 TOLEDO FACTORIES BLDG. • TOLEDO 1, OHIO
Call CHerry 8-3518

NEW

REVOLUTIONARY, VERSATILE, DIE-CUTTERS AFFORD MANY IMPROVED ADVANTAGES

TRONOMATIC*

Extra High Force...Air Hydraulic, Heat Assist Die Cutting Presses

Model No. D2436 HSX

Tronomatic engineering has created this new approach to improved die-cutting. By combining controlled heat with High force, at speeds comparable to mechanically-operated presses, it allows almost unlimited cutting die lengths. Can cut 1000" steel rule on .010" acetate...or 400" of oriented styrene. Accommodates both sheet plastic and complete multiple blister, or skin package cards. Single micrometer stop, adjustable to .0005", protects dies, allows scoring and multi-plane cutting.

Low Die Costs
Low Maintenance Costs
High Quality Production
High Operating Safety

Available In 4 Standard Sizes or Custom Engineered For Your Needs. 24" x 36" Press is available up to 50-tons. Larger press capacity in excess of 100-tons in standard sizes, including 30" x 50", 40" x 60" and 48" x 72". High speed indexing and single or double. Shuttle table available for efficiency of operation. Heat-assist cutting allows near unlimited cutting capacity.

T TRONOMATIC

Tronomatic Machine Manufacturing Corporation
1881 Park Avenue, New York 35, N. Y. • Sacramento 2-4611

*MANUFACTURERS OF PLASTIC FORMING, MOLDING, FABRICATING, SEALING AND CUTTING EQUIPMENT.

CLASSIFIED ADVERTISEMENTS

EMPLOYMENT • BUSINESS OPPORTUNITIES • USED OR RESALE EQUIPMENT

Machinery and Equipment for sale

FOR SALE: 1—Baker Perkins 100 gal. Sigma Blade Mixer; 1—Baker Perkins size 16 TRM, 150 gal. double arm, Vacuum Mixer; 1—Rotary Cutter; 1—Kent 6" x 14" three roll Mill; 6—Stokes Model DD2, DS3, D3, and B2 Rotary Preform Presses; 4—Stokes Model "R" single punch Preform Presses. Also: Sifters, Banbury Mixers, Powder Mixers, etc., partial listing; write for details; we purchase your surplus equipment. Brill Equipment Co., 35-55 Jabez St., Newark 5, N. J. Tel. No. Market 3-7420.

FOR SALE: Ovens, Grinders, Powder Mixers, Injection Molding Machine 1 oz. to 60 ozs. never used and used. Two-head Bottle Blowing Machine. Acme Machinery & Mfg. Co., Inc., 20 South Broadway, Yonkers, N.Y. YOnkers 5-0900. 102 Grove Street, Worcester, Mass. PLeasant 7-7747.

MOST MODERN PACKAGING AND PROCESSING MACHINERY — AVAILABLE AT GREAT SAVINGS: Baker Perkins JNM-2, 50 gal. Stainless Steel Heavy Duty Double Arm Mixer with Hydraulic Tilt. Baker Perkins, W & P and Day Double Arm Steam Jacketed Heavy Duty Mixers—50, 75, 100, 150 and 200 gal. capacities. Day 2½ gal. MDA Mogul D.A. Vac Experimental Mixer. Fitzpatrick Models D, D-6 and K Stainless Steel Comminuters. Werner & Pfleiderer 3 000 gal. and 3.500 gal. Jacketed Double Arm Mixers. Stokes Models R, RD-1 and DD2 and Eureka Tablet Machines. Colton 2RP, 3RP, 3B, 5½ T Tablet Machines. Mikro Pulverizers, Models 1SH, 2TH 3TH and 4TH. Day, Robinson 50 to 10,000 lbs. Dry Powder Mixers. Jacketed and Unjacketed. Package Machinery, Hayssen, Scandia, Wrap King, Campbell, Miller Wrappers. Pneumatic Scale Automatic Carton Feeder, Bottom Sealer, Wax Liner, Top Sealer with Interconnecting Conveyors. Pneumatic Scale Tite Wrap. Standard Knapp, A-B-C, Ferguson Carton Sealers. Union Standard Equipment Company, 318 Lafayette Street. New York 12, N. Y. Phone: CAnal 6-5334.

CHECK THESE FINE MACHINES: Model R-4 Stokes Tablet Press. Complete with 5 HP U. S. Vari-Drive, new in 50's, excellent condition. 2 oz. Van-Dorn Injection Molding Machine, Model 1 ♯H-200. Semi-Automatic Operation. Complete, with wheelco controls and timers. 4 yrs. old. 600 ton Adamson Multi-Opening Hydraulic Press. 26" diameter chrome plated ram, slab side construction. Press contains nine 42" x 42" platens. Late Type, Transfer Press. 75 ton Baldwin-Southwark. Completely self-contained with operating controls. Two 28 oz. Watson-Stillman Injection Molding Machines. Late Type Equipment. Can be inspected under power. 12 oz. Watson-Stillman and 8 oz. Reed Prentice Injection Molding Machines. Inspect Under Power. PLASTIC EXTRUDERS: NRM 2½"—Royle 3¼"—Hartig 3¼"—Adamson 6"—Farrel 3". Also a complete line of Blenders, Mixers, Scrap Cutters and other equipment for the Plastic and Rubber Industry. What Do You Need? What Do You Want? We Will Finance. JOHNSON MACHINERY COMPANY, 683 Frelinghuysen Ave., Newark 12, New Jersey. BIgelow 8-2500.

FOR SALE: Stainless reactors or resin Kettles: 3500, 2200, 1900, 1300, 1000, 750, 500, 350 gal. jktd. and agit. Baker-Perkins dbl. arm mixers: 200, 100, 50 gal. capacity, steel or stainless. Perry Equipment Corp., 1429 N. 6th St., Phila. 22, Pa.

FIFTY LATTNER BOILER dealers throughout the country have used and like new automatic steam boilers for sale. Small sizes ½ to 35 H.P. Gas, oil or electric fired. Write for name of dealer near you. Lattner Mfg. Co. Cedar Rapids, Ia. Box 1710.

FOR SALE: Two 1954 DeMattia 12/16 oz. Injection Molding Machines. 400 ton clamp. Good condition. Can be seen in operation. Reply Box 6420, Modern Plastics.

FOR SALE: 600 Ton Compression Press, 24" Downacting ram, 36" stroke, two 8" pushback cylinders, "T" slotted beds, 38" left to right, 41" front to back, self-contained. Loranger Plastics Corp., Warren, Penna. Telephone RAndolph 3-9600.

FOR SALE: China Plastic Company blow molding machine with 3-inch extruder and double head. Can be automated. Almost new. May be test run in our plant any time. Molds available. Price: $3,500.00. Call or write Knickerbocker Plastic Co., Inc., 11501 Hart Street, North Hollywood, California. Phone Triangle 7-5281.

FOR SALE: 1—Farrel Birmingham 22" x 60"—2 roll plastics mill, 150 HP; 1—Baldwin Southwark 150 ton self-contained compression molding press; 2—MPM 1½" and 2½" electrically heated plastic extruders; 2 Cumberland 7" stair step dicers, stainless steel; 2—Ball & Jewell granulators, 2 and 10 HP; also mixers, preform presses, etc. Chemical & Process Machinery Corp., 52 9th Street, Brooklyn 15, N.Y., HY 9-7200.

FOR SALE: One, 12A Watson-Stillman, 1945, injection molding machine, in excellent condition. Can be seen running at Robinson Plastics Corp., 132 Lafayette Street, New York 13, N.Y. WOrth 2-7246—Mr. Rubin.

POWDER BLENDERS: 10,000 lbs. Lab. Mill 6 x 16. 1 Farrel 16 x 36 Mill 30 HP motor & drive. Baker Perkins 150 gal, 2 arm, 40 HP; 100 gal, 2 arm, 50 HP, S. S. jacketed, vacuum, hydr tilt. Stokes 3 DDS2, 1 S, 1 T 6 R's. Calendar 6 Roll 5" x 12". 1 S. S. Powder Blender. Ball Mills. Machinecraft Corp., 800 Wilson Ave., Newark 5, N.J. Mi 2-7634.

FOR SALE: 1—Nash 103-10 rotary finisher, late model; 1 Binks 3' x 4' spray booth, like new 1959; 1—Sepanski W-52-H paint mask washer, like new; 1—5 HP polishing lathe. All in good condition, at greatly reduced prices. Milwaukee Plastics, Inc. 4044 N. 31st Street, Milwaukee, Wis.

LIQUIDATION—COMPLETE FOAM LATEX PLANT: Equipment Still in Place Where Operated On Location—Upper New York State. *All Motors 3/60/220-440—*All Steam Coils 90♯ PSI—*All Air Controls 100♯ line—Mechanical Pouring, Curing, Handling Line 240' Long, 12' W., 25' High. Leon Automatic Washer for Latex Pads with Washer and Squeeze Rolls, Conveyor Rolls, Air Cylinders, Tanks and Controls. Laboratory Atmospheric Cure Chamber; 36" x 36" x 24" complete. Mechanical Handling Systems Dryer; 17 Sections; 85" x 160' Long; Lydon Truck Dryer; 12' W., 7' H, 100' Long; 21 Car Capacity with Turn Table, Electric Eye, with all controls, valves, etc. Hohl Belt and Roller Conveyors; 36" wide, 18' High, 45° Angle. Scrap Dryer, 30' Long, 15' Wide, 11' High; 12 Car Capacity; 2 Adamson Vulcanizers; 72" x 16'; 25 Cars; 125♯ ASME; complete. Paul Abbe Buhr Stone Lined Pebble Mills; 60" x 72"; 45" x 48"; 37" x 48". Compounding and Storage Tanks including (2) Plastic Lined 3000 Gal. and Steel Tanks up to 12,000 Gal. some Jacketed and Agitated. Permutit Water Treating System; Hot Water Control System. Marley Cooling Tower; 150 Ton Graham Refrigerating System. MISCELLANEOUS: Ventilating and Exhaust Systems; Glass Lined Diaphragm Valves. Piping; Pumps; Taylor Instruments; Mold Racks; Automatic Moisture Tester; Stabilizing Tester; Truck Scale; Wringer Rolls. Squeeze Rolls, Randell Dusting Machines; Air Cylinders and General Factory Handling Equipment. RELATED RUBBER EQUIPMENT AVAIABLE FROM STOCK. Baker Perkins heavy duty jacketed double arm mixers to 300 gal. Farrell Birmingham and other two roll rubber mills; 14" x 30", 16" x 42"; 18" x 42"; 22" x 60"; late type top cap. 2 roll Horizontal Calendar 12" x 24" with 15 Hp motor and drive. Birmingham 3 roll calendar 22" x 58" with 125 Hp motor and drive. Banbury "Type B" mixer; utility rubber cutter; Flow Meter Combinators. ChemicColloid Mill Model A 15; SS Rotor-Stator; 15 Hp 3525 RPM Motor Stokes Vacuum Impregnator Model 5648; 100 PSI Internal and Jacket EXTRUDERS: Royle 1½"; 2¼"; Allen 2" Extruder; NRM 1½" HYDRAULIC PRESSES; Southwark 36" x 36"; Stewart-Bolling 36" x 36" French Oil Mill and Dunning & Boschert Presses 10" and 12" Rams. First Machinery Corp., 209-289—10th St., Bklyn 15, N.Y.—ST 8-4672.

FOR SALE: (1) Mitts & Merrill 14 CE Hog-Steel cylinder, roller bearing, w/75 Hp motor, direct drive, mounted on steel base. Three years old. (3) Dunning & Boschert scrap presses—500 ton hydraulic-20" ram-30" Hoop Diam x 40" deep—Excellent condition. For information and prices contact Atlan Soap Works, Inc., 125 Chapel Street, Newark, New Jersey.

FOR SALE: 6 New Farrell Birmingham 14" x 30" two roll mills. Watson-Stillman 240 ton, ten 24" x 56" platens. Baldwin-Southwark 200 ton semi-automatic transfer molding press. 225 ton 16" record presses. French Oil 120 ton self-contained. Stokes 50 ton semi-automatic. Others from 30 to 500 tons. Hydraulic pumps and accumulators. New ¾ oz. Bench Model Injection Machines. Van Dorn 1 oz. and 2 oz. Other sizes to 100 oz. Baker Perkins and Day Jacketed mixers. Plastic Grinders. Seco 6" x 13" and 8' x 16" mills and calenders. New ¾" Plastic Extruder and other sizes up to 6". Stokes BB2 & RD3 Rotary Preform Tablet Machines, also single punch. Partial listing. We buy your surplus machinery. Stein Equipment Co., 107-8th St., Brooklyn 15, N.Y.

Machinery wanted

FOR SALE: Fellows 8 oz. molding machine, new in 1955. Low pressure closing. Leeds & Northrup instruments. Has been well maintained and is in excellent running condition. May be seen in operation. Sterling Plastics Co., 1140 Commerce Ave., Union, New Jersey.

WANTED TO BUY: Used injection molding machines, oven, granulators. One machine or complete plant. Acme Machinery & Mfg. Co., Inc., 20 South Broadway, Yonkers, N.Y. YOnkers, 5-0900, 102 Grove Street, Worcester, Mass. PLeasant 7-7747.

WANTED: 32 oz. or larger injection molding machine. Reply Box 6419, Modern Plastics.

WANTED TO BUY: 1—60" Knife over roll coater. 1—Set 8" x 60" Squeeze rolls for conversion to embossing rolls (bottom roll rubber). 15—60" Radiant heating units. Reply Box 6436, Modern Plastics.

Materials for sale

FOR SALE: P/E Blow Molding and Houseware Compounds made to fit your job. H.I., M.I. and G.P. P/S, Acetate, Propylene, Butyrate. For quality, price and service call AX 1-5550. Amco Plastics Processors, 183-02 Liberty Avenue, Jamaica, 12, New York.

Famco Veil Mat, Part #560125, 319,000 Sq. Ft., Surfacing Mat. Type "500 F" which has a low binder content recommended for flat sheets and gently curved products. .010" thick. 24" wide. 280' long (nominal). J. B. Quinn, The Brunswick-Balke-Collender Co., 2650 East Kilgore Road, Kalamazoo, Michigan.

HIGHEST GRADE Correct Melt Index. Reprocessed Polyethylene Pellets, All colors by a multi-million dollar firm, lowest prices in USA. Delux Plastics Co., 22821 Arlington Avenue, Dearborn 7, Michigan.

FOR SALE PLASTICS SCRAP: Approx. 5,000 lbs. Polyethylene Rolls, Mill Stock, 3 & 4 Mill, 20¼" and 15¼" wide—.32¢ lb. Approx. 20,000 lbs. Polyethylene Film, Clear—.20¢ lb. Approx. 10,000 lbs. Polyethylene Film, Printed—.15¢ lb. Approx. 15,000 lbs. Polyethylene Pellets, Natural Virgin, with & without melt index—.26¢ lb. Approx. 10,000 lbs. Polyethylene Film, Blue—.15¢ lb. Approx. 5,000 lbs. Polyethylene Film, Red—.15¢ lb. Approx. 30,000 lbs. Polyethylene Grindings—.08¢ lb. Mylar and Acetate Rolls (spliced) 1 mill, 24" and 48". All prices F.O.B. Kansas City. Harry Kaufman Co., 1311 West 13th St., Kansas City, Mo.

3 OZ. ROVMAT—SURPLUS 19,000 lbs. of 2 oz. weight, 20 end continuous rovings spaced 3 to the inch. 3" wide rolls. Produced by Fiber Glass Industries. Will sell at bargain price. J. B. Quinn, The Brunswick-Balke-Collender Co., 2805 E. Kilgore Road, Kalamazoo, Michigan.

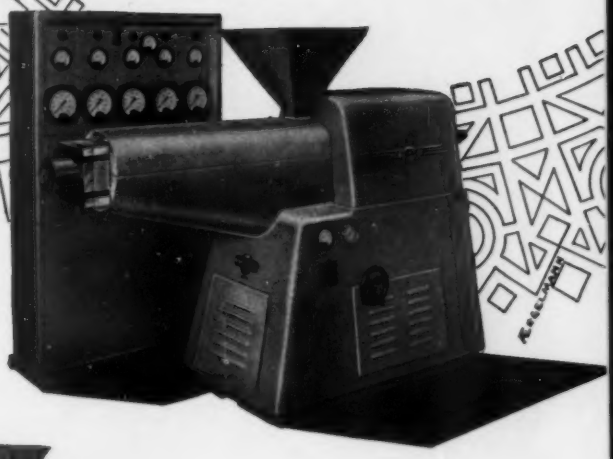
13¢ PER LB. CYCOLAC: 5,000 lbs., mixed color, reground, f.o.b. Indianapolis 22, Indiana. Many other regrinds at low prices, reg. Styrene, Hi-impact etc. Reply: United Plastic Company, 539 North Miley Avenue, Indianapolis 22, Indiana.

(Continued on page 256)

(Continued from page 254)

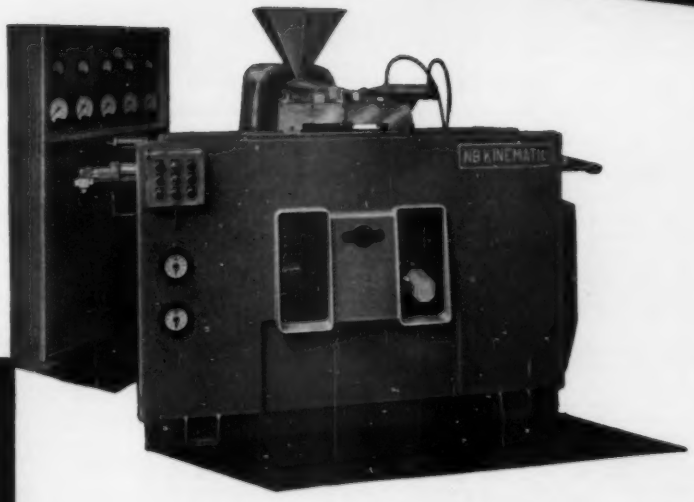
WISH TO PURCHASE Hydraulic Molding

automatic
self contained
injection
moulding
machines



extruders and
complete
extruding
equipments

Patented
"NB-Kinematic"
blowing machines
for bottles,
toys etc.



a fortune in your hand

NEGRI BOSSI & C.

MILANO - VIA BAZZINI 24 - TEL. 230.512 - 292.897 CABLES NEGRIBOS MILANO
ITALY

(Continued from page 254)

FOR SALE: 2,000 lbs. Nylon 6 Natural. Clean and free of contamination. Suitable for regrinding and use for injection molding $.45 per lb. F.O.B. Detroit, Michigan. Cadillac Plastic & Chemical Co., 15111 Second Ave., Detroit 3, Michigan.

Materials wanted

WANTED: Plastic of all kinds—virgin, reground, lumps, sheet and reject parts. Highest prices paid for Styrene, Polyethylene, Acetate, Nylon, Vinyl, etc. We can also supply virgin & reground materials at tremendous savings. Address your inquiries to: Gold-Mark Plastic Compounds, Inc., 4-05 26th Ave., Long Island City 2, N. Y. RAvenswood 1-0880.

WANTED: All types of plastic scrap and surplus inventories such as: styrenes, butyrates; acetates, acrylics, and polyethylenes in any form. Write, Wire or Phone Collect. MAdison 3111. Philip Shuman & Sons. 571 Howard Street, Buffalo 6, New York.

GET THE TOP MONEY FOR PLASTIC SCRAP: Now paying top prices for all thermoplastic scrap. Wanted: polystyrene, cellulose acetate, vinyl, polyethylene, butyrate, acrylic, nylon. All types and forms including rejects and obsolete molding powders. Fast action wherever you are located. WRITE, WIRE, TODAY! Reply Box 6423, Modern Plastics.

WANTED: All types plastic scrap, film, chunks, bleeder stock. Surplus inventories, polyethylene, vinyl, styrene, nylon, etc. We are a multi-million dollar company. Deluxe Plastic Co., 20201 Hoover Road, Detroit 5, Michigan.

NYLON SCRAP wanted by reprocessor. Quotations promptly furnished on all grades of nylon extrusion, molding and fabricating scrap. Adell Plastics, Inc. 5208 Eleanora Ave., Baltimore 15, Md.

WANTED: Vinyl and polyethylene scrap, rejected molded parts, surplus molding powders. Sell your scrap to one of America's most progressive scrap processing plants. Alan Plastics Corporation, Canton, Mass.

WANTED: Plastic scrap. Polyethylene, Polystyrene, Acetate, Acrylic, Butyrate, Nylon, Vinyl, George Woloch, Inc., 514 West 24th Street, New York 11, N. Y.

Molds for sale

SURPLUS INJECTION MOLDS: For Polystyrene operation: 12 cav. Pocket Comb; 8 cav. Men's Comb; 6 cav. Sungoggle; 8 cav. Sungoggle; 144 cav. Ball Button 10 mm; 128 cav. Ball Button 12 mm; 48 cav. Doll Dishes; 4 cav. Tractor; 4 cav. Delivery Truck; 1 cav. Bread Basket; 4 cav. Refr. Box; 12 cav. Pencil Sharpener; 4 cav. Helicopter; 5 cav. Rifle 25"; 24 cav. Building Block Set; 6 cav. Salt & Pepper Shaker; 24 cav. Pharmaceutical containers, ass. sizes; 3 molds for Packaging containers (3 sizes). For Polyethylene operation: 1 cav. Bread Basket; 1 cav. rectangualr Doily; 4 cav. 6" Trucks (4 different); 2 cav. 9" Tow Truck; 4 cav. 5" Automobile (4 diff. 1959 Models); 12 cav. Soldiers; 1 cav. Water Pitcher; 4 cav. 8 oz. Tumbler. Alfred A. Rosenthal, 3 Park Row, New York 38, N.Y.

ATTENTION CUSTOM MOLDERS, FOR SALE, PLASTIC MOLDS. Diversify now. Proprietary injection products. Long-established active consumer line doing $1,000,000 nationally. No equipment to buy. Includes all dies, assembly fixtures, etc. You are in business overnight. Selling chains, dept. stores, super marts, premiums, etc. Buy inventory at cost or less and pay when sold. Nothing for good will. Cash $50,000. Reply Box 6421, Modern Plastics.

Molds wanted

WANTED: Three obsolete injection molds for experimental work. Must be in good operational shape. 1) 32 to 48 oz. shot, such as machine housing, radio cabinet, or big toy. 2) 16 to 24 oz. shot, such as breaker strip, freezer chest door, small radio, or grill. 3) 80 to 120 oz. shot, such as TV cabinet, door liner, or phono cabinet. We would consider a compression mold which could be converted. Please include part and mold drawings with price and location for inspection. Reply Box 6422, Modern Plastics.

WISH TO PURCHASE Houseware Molds of all types for injection molding. Please submit full information. Reply Box 6435, Modern Plastics.

Help wanted

PERSONNEL: Executive—Technical—Sale—Production. Employers and Applicants—whatever your requirements, choose the Leader in Personnel Placement. Cadillac Associates, Inc., Clem Easly—Consultant to Plastics Industry, 29 E. Madison St., Chicago, Ill.—Wabash 2-4800. Call, write or wire—in confidence.

MARKET DEVELOPMENT: Opportunity to join Spencer Chemical Company's expanding Plastics Market Development program in a position which will permit the use of sales and technical abilities. We are seeking men who have a chemical or engineering background, and preferably three to five years' experience with thermo-plastics. Please send detailed resume to: W. H. Swope, Jr., Personnel Manager, Spencer Chemical Company, 610 Dwight Building, Kansas City 5, Missouri.

NEED EXPERIENCED MAN with know how of plastic reprocessing operation. Prefer person willing to make investment. Forward complete resume of background and experience. Replies will be held in strictest confidence. Internation Rubber & Plastics Company, 1017 Chouteau Avenue, St. Louis 2, Missouri.

HELP WANTED—MALE: Salesman for Metropolitan-New York area for small but expanding plastic concern, preferably experienced in sale of off-specification and reprocessed material. Terrific opportunity. Our employees know of this ad. Reply Box 6426, Modern Plastics.

PLASTICS SALESMAN: Spencer Chemical Company seeks a man with enthusiasm, drive, and a desire for future progress in a plastics sales assignment. Preferably, we would like a man with a technical education and approximately five years' industrial sales experience. This position offers an excellent opportunity for future advancement in an expanding organization. Please send a complete resume of your experience, education, and salary requirements to: Personnel Manager, Spencer Chemical Company, 610 Dwight Building, Kansas City 5, Missouri.

SOHIO CHEMICAL COMPANY—Wants: Needs: Expects To Hire: For Market Research and Product Development—2 Men: who like small company atmosphere and personal recognition combined with large company resources. 1 Man: Experienced in market research in fibers and/or thermoplastics. Prefer actual market research experience, but will consider men with adequate technical know-how and an interest in marketing. 1 Man: Experienced in the development and introductory sales of thermoplastic resins. Prefer 5 years development or technical service experience. Position will require man capable of starting with research results and carrying programs through to commercial sales. Please send confidential resume and salary requirements to: R. S. Knight, Manager, Employee Relations, Sohio Chemical Company, P. O. Box 628, Lima, Ohio.

EXPERIENCED ENGINEER: Leading eastern plastics molder has excellent opportunity for well qualified engineer thoroughly familiar with injection and blow molding. Write stating full details to: Box 6430, Modern Plastics.

SALES REPRESENTATIVES WANTED: Well established leading East Coast custom extruder requires representation in the following areas: Illinois, Wisconsin, Florida to Virginia. Facilities include 18 extruders plus all fabrication and auxiliary operations. Serving electronics, appliance, hardware, automobile, pen, furniture, office supply and many other industrial applications. Box 6428, Modern Plastics.

CHEMIST: Excellent opportunity for ambitious chemist with experience in Pearl Essence. Good salary to start and progressive compensation. Reply Box 6432, Modern Plastics.

SALES MANAGER: Plastics. Progressive custom formulator located in Southeast seeking Sales Manager with experience, initiative and imagination. Specific experience in plastisols desirable. Give full details of background and salary requirement. Box 6424, Modern Plastics.

SALES REPRESENTATIVES WANTED for established Pearlescent Pigment Manufacturer. Knowledge of plastic compounding and coating industries required. Several choice territories open. Rona Laboratories, Inc., Bayonne, N.J. He-7-0800.

PLASTICS BOTTLES Manufacturer seeks blow molding production man with heavy experience in bottles to take full charge of bottle production. Modern New York City Plant. Excellent opportunity. Write full details including experience and salary desired. Box 6427, Modern Plastics.

IF YOU ARE a responsible go-getter and looking for a line of plastic pipe produced by a reputable company, look no further, contact Sales Manager Plastic Pipe Department St. Regis Paper Company Panelyte Division RFD #3, Old 40 East, Richmond, Indiana.

MANUFACTURER'S AGENTS WANTED: Openings for representatives throughout the country with creative ideas for plastic injection molded and extruded products. We want to establish additional proprietary items in building products, housewares, premiums, toys, automotive or what have you. Box 6400, Modern Plastics.

SALES REPRESENTATIVE WANTED by young, expanding, aggressive laminating company. We laminate and coat plastic films, fabrics, paper and metallized products in continuous rolls to 60" wide, for use by both industrial and novelty manufacturers. Desirable exclusive territories open on commission basis. Reply stating territory desired to: Lamart Corporation, 2 Waldo St., Clifton, New Jersey.

PLASTICS MANAGER: Complete charge of modern compression molding department. Experience in semi and fully automatic presses. Metropolitan New York location. Supervise several assistants. Good salary and bonus. Write full details and salary desired. Reply Box 6401, Modern Plastics.

MANUFACTURERS' REPRESENTATIVE wanted to handle custom extrusions of shapes and profiles. Should now be selling custom injection moldings to industrial concerns and desire extrusions to complete line. Excellent opportunity to work with aggressive specialized company. Reply in detail. Box 6402, Modern Plastics.

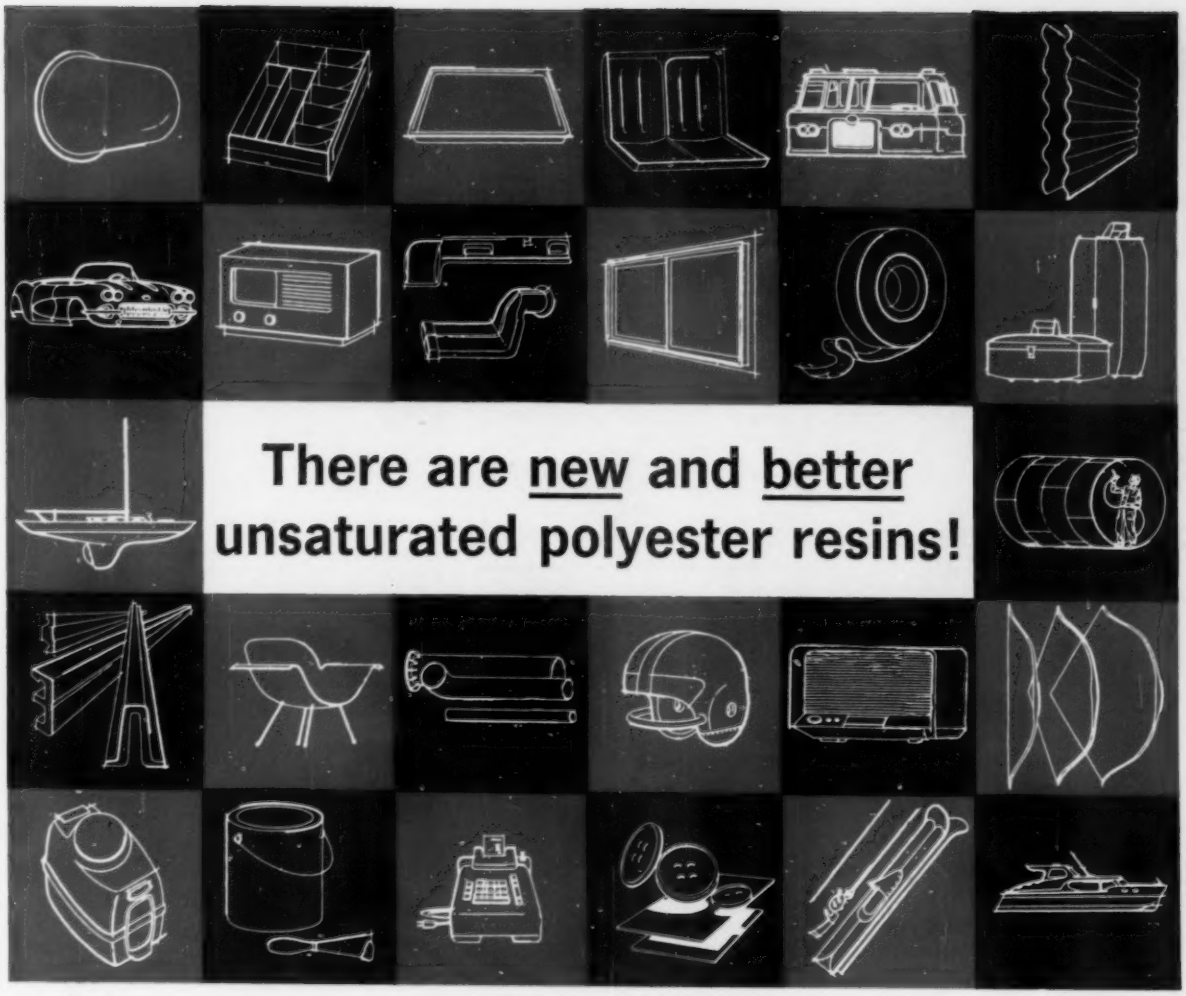
WANTED CHEMIST—CHEMICAL ENGINEER Experienced in synthetic polymer and epoxy base sealers, adhesives and coatings. Required for product development—Midwest location. Submit resume and salary required. All replies held in strictest confidence. Reply Box 6403, Modern Plastics.

PLANT MANAGER: Medium sized established and growing custom molder in the New York Metropolitan area, offers excellent opportunity to right man. Must have supervisory background and knowledge of thermosetting materials, estimating, engineering and production. Send resume and salary expected. Reply Box 6437, Modern Plastics.

SALES REPRESENTATIVES WANTED: A well established mid-western manufacturer has openings for established manufacturers representatives to work on commission basis in major Eastern cities, also St. Louis and Minneapolis. Products consist of fabricated film items and plastic filters. All products dielectrically sealed. We are searching for reps presently selling plastic or rubber items. Reply Box 6409, Modern Plastics.

PLASTIC SALESMAN WANTED: Progressive company expanding into plastic bottle business wants a metropolitan New York salesman. Experience in blow molding preferred. Salary open. Send resumes to Box 6408, Modern Plastics.

(Continued on page 258)



There are new and better unsaturated polyester resins!

The use of unsaturated polyester resins made with Oronite Isophthalic provides plastics products with greater physical strength with no increase in weight, better resistance features, greater retention of strength and appearance under and after stress and exposure to time, temperature, water, chemicals and weather.

These improvements have been proven in actual experience at reasonable cost and without need for design or process changes. Fiber glass reinforced plastics employing Oronite Isophthalic based resins are gaining wide acceptance in both structural and non-structural equipment and accessories. Other new applications include adhesives, sealing and filling compounds and special coatings.

Ask Oronite for isophthalic polyester resin formulations and samples. Possibly Oronite has a suggested formulation that will perform better in the products you market, or intend to market.

ORONITE CHEMICAL COMPANY
A CALIFORNIA CHEMICAL COMPANY SUBSIDIARY

EXECUTIVE OFFICES • 200 Bush Street, San Francisco 20, California
SALES OFFICES • New York, Boston, Wilmington, Chicago, Cincinnati, Cleveland, Houston, Los Angeles, San Francisco, Seattle
Foreign Affiliate: California Chemical International, Inc., San Francisco, Geneva, Panama

8454-R

(Continued from page 256)

NATIONALLY KNOWN midwest plastics manufacturer has opening for manager in modern expanding plant. Applicant must have experience in similar type postion, be personable and have the ability to mix men and processes amiably and profitably, fast moving and know the value of satisfied customers' quick deliveries. Salary open. Reply with complete resume which will be held in confidence. Box 6431. Modern Plastics.

CHEMIST OR TECHNICIAN with sound technical background in industry, organic coatings, plastics or pigments wished by expanding USA organization of large international concern to head technical service laboratory. Creativeness, initiative and spirit are prerequisites. State qualifications and salary in resume. All replies treated confidentially. Reply Box 6414, Modern Plastics.

MECHANICAL OR ELECTRICAL ENGINEER For Plant Engineer: A unique ground floor growth opportunity for a young engineer, with some plastics or rubber machinery experience, in new plastics plant at Newcomerstown, Ohio, with Seiberling Rubber Company. There are excellent growth and advancement possibilities for the man with the right qualifications. This position includes plant and machinery layout, installation, maintenance, and servicing all equipment and buildings, including production operations, recommending alterations, purchases, cost reduction and improvement of machinery facilities. Will direct and advise small maintenance force. Complete fringe benefits paid by the company. Please forward complete resume in confidence directly to the Personnel Department, Seiberling Rubber Company, Akron 9, Ohio.

SALES ENGINEER familiar with the "connector business". Opportunity for right man. Reply Box 6434, Modern Plastics.

COATINGS CHEMIST to head up development laboratory. Must be familiar with dispersion type coatings for fabrics and be able to initiate development work and follow through to production. State education and experience in first letter. Reply Box 6417, Modern Plastics.

PROGRESSIVE, young, moderate-sized firm has openings in quality and technical control and research. Present project includes molding and casting of Thermoplastics and Thermosetting resins. Experience along these lines desirable. Opportunity for real growth. Located—New Jersey, 35 minutes from New York City. Reply Box 6405, Modern Plastics.

ENGINEER: Fiberglas Boat operation. Full responsibility for production. Must have actual background experience in research, development, and work process methods of fiberglas boats and other products. Good salary. Excellent opportunity. Liberal employee benefits. Write The Aluma Craft Boat Company 2637 27th Avenue South, Minneapolis 6, Minn.

PLASTIC MOLD ENGINEER. With approximately 5 to 8 years experience in injection mold design. Excellent opportunities. Send complete resume including salary requirements. Reply Box 6404, Modern Plastics.

Situations wanted

PLANT MANAGER: Conversant with batch and flow line production. Good all around knowledge of processing techniques with special interest in reinforced materials and plastics in building application. Strong organizer, believes in mechanization and full plant utilization. Age 35, single. Box 6425, Modern Plastics.

FOREIGN CONNECTIONS. Chemist leaving February for an extensive trip to West Germany, with best connections in chemicals, plastics, polyurethane foams and electronic industry, seeks assignments. Write S. Lipson, 40-41 27th St. Long Island City, N.Y. or call EMpire 1-2689.

A TECHNICAL ENGINEER, formerly in our employ, has been forced to move to the New York, New Jersey area for personal reasons. This man has an extensive knowledge of vacuum-forming, product engineering, design, tooling, etc. If you have need for a man of this type, please contact Skycrafters Corporation, 2600 N. Pulaski Road, Chicago 39, Illinois.

PLASTICS CHEMIST: PhD in organic chemistry. Educated in Western Europe. Age 40. 9 years employed by important plastics producers there and in this country. Desires Important, Leading Position with responsibility in product development, engineering or research in renowned company. Expert in thermoplastic resins, their properties and their technical applications (plastic, films, emulsions, lacquers, adhesives, glass reinforcements). Experienced in formulating compounds, evaluating and testing new products, and technical service. Reply Box 6406, Modern Plastics.

MANUFACTURER'S REPRESENTATIVE: Covering lucrative Southern 5 state area, namely: Florida, Georgia, Alabama, North and South Carolina, calling on Manufacturing Plastic Industry seeks additional lines in Virgin and re-processed molding and extrusion compounds in unlimited quantities and other related lines for this trade. Reply Box 6410, Modern Plastics.

CHEMICAL ENGINEER, 35: Successful, energetic, bored. Multiplant experience in cost analysis and project engineering. Currently assistant to plant manager supervising cost control, purchasing, industrial engineering, payroll and financial accounting, transportation. Desire technical administrative position in small growing company in eastern U. S. Resume on request. Reply Box 6411, Modern Plastics.

PLASTIC & FOUNTAIN PEN EXPERT: British subject, age 45, fully conversant with compression, injection and blow molding, seeks position in executive capacity with progressive company in U.S., Canada, U.K., British Commonwealth, Latin America. Preference for position requiring traveling throughout world. Languages: English, Spanish, Portuguese. Casilla Correo 79, Surcursal 16, Buenos Aires, Argentina.

SALES—COATED FABRICS, THERMOPLASTICS: Energetic and creative young man with twelve years diversified sales, administrative and management experience, seeks responsible challenging position with aggressive growing mill or integrated converter. Successful background in coated fabrics, papers, calendered, laminated and extruded thermoplastics. Reply Box 6413, Modern Plastics.

REINFORCED PLASTIC CONSULTANT: MIT Graduate in Chemical Engineering. Business & Engineering administration. Experienced in all phases of reinforced plastics. Excellent background in new product development, production, market analysis and development. Specialist in premix, prepreg, and catalyst formulation. Well versed in all types of molding, new materials, and techniques. Reginald B. Stoops, 52 Hoyt Street, Stamford, Conn. Tel.: FIreside 8-0576.

ENGINEER-MANAGER: M. E., P. E. Over 15 years experience project engineering and development in chemicals, plastics and packaging. Heavy supervisory background in unsupported polyethylene films, with additional experience in plastic coatings, laminations and vacuum metallizing. Seeks demanding position with solid future. Reply Box 6418, Modern Plastics.

MANUFACTURER'S REPRESENTATIVES: Custom injection molder specializing in precision industrial components in Nylon, Delrin, etc., to OEM accounts desires representation in Indiana, Northern Ohio, & Illinois, excepting the Chicago area. Men we are seeking must be experienced in selling on basis of quality, service, & experience. AGP Corporation, PO Box 318, Peru, Indiana.

Miscellaneous

ESTABLISHED, EXPERIENCED REPRESENTATIVE covering industrial New York State (except Metro. NYC) in market for progressive, responsible plastics molder. Prefer one having both injection and compression equipment, with complete finishing and quality control facilities. Must offer service and quality, with competitive prices and delivery. Reply Box 6429, Modern Plastics.

PROGRESSIVE INJECTION Moulders seeking articles for manufacture under license. General lines up to 4 ozs. capacity. Manager will call on prospective contacts between February and April 1960. Please write Plastic Accessories Pty. Ltd., Waterloo, N.S.W., Australia.

WANTED PLASTICS FIRM: Progressive oil company established in petrochemicals and related fields seeking equally progressive plastics firm. Particularly interested in well managed diversified medium size company engaged in molding, extrusion and related operations in need of capital for expansion or raw material integration. Principals only. Replies kept confidential. Reply Box 6416, Modern Plastics.

WANTED TO BUY: All or part of plastics operation. Well experienced in all phases of fiberglass molding and plant operation. Have youth, executive experience, and substantial capital to invest in suitable deal. Reply Box 6415, Modern Plastics.

CONTRACT WORK WANTED: Compression molder in New York City area offers production facilties of established firm having excellent equipment and skilled labor. Reply Box 6433, Modern Plastics.

FOR SALE OR LEASE: Well equipped plastic mold shop in own new building. Capacity for employment of 12 to 15 men per shift. Presently operating at low level. Open for inspection at any time. Facilities list available on request. Located North Central Indiana. Reply Box 6412, Modern Plastics.

COMPRESSION MOLDER: Well established NYC area seeks contract work. Also interested in entering new plastic venture including blow molding or injection molding dependent upon right man. Reply Box 6407, Modern Plastics.

CONSULTING CHEMIST—Plastics and Adhesives. Seventeen years of trouble-shooting in application research and product development on vinyls, cellulosics, styrenes, polyethylene, phenol- and urea formaldehyde as well as structural adhesives, particularly epoxy-based compositions. Werner H. Guttmann, 21 Leroy Street, N.Y. 14, N.Y., Tel: WAtkins 4-6088.

RATES FOR CLASSIFIED ADVERTISING

All classified advertisements payable in advance of publication

Closing date: 10th of preceding month, e.g., March 10th for April issue

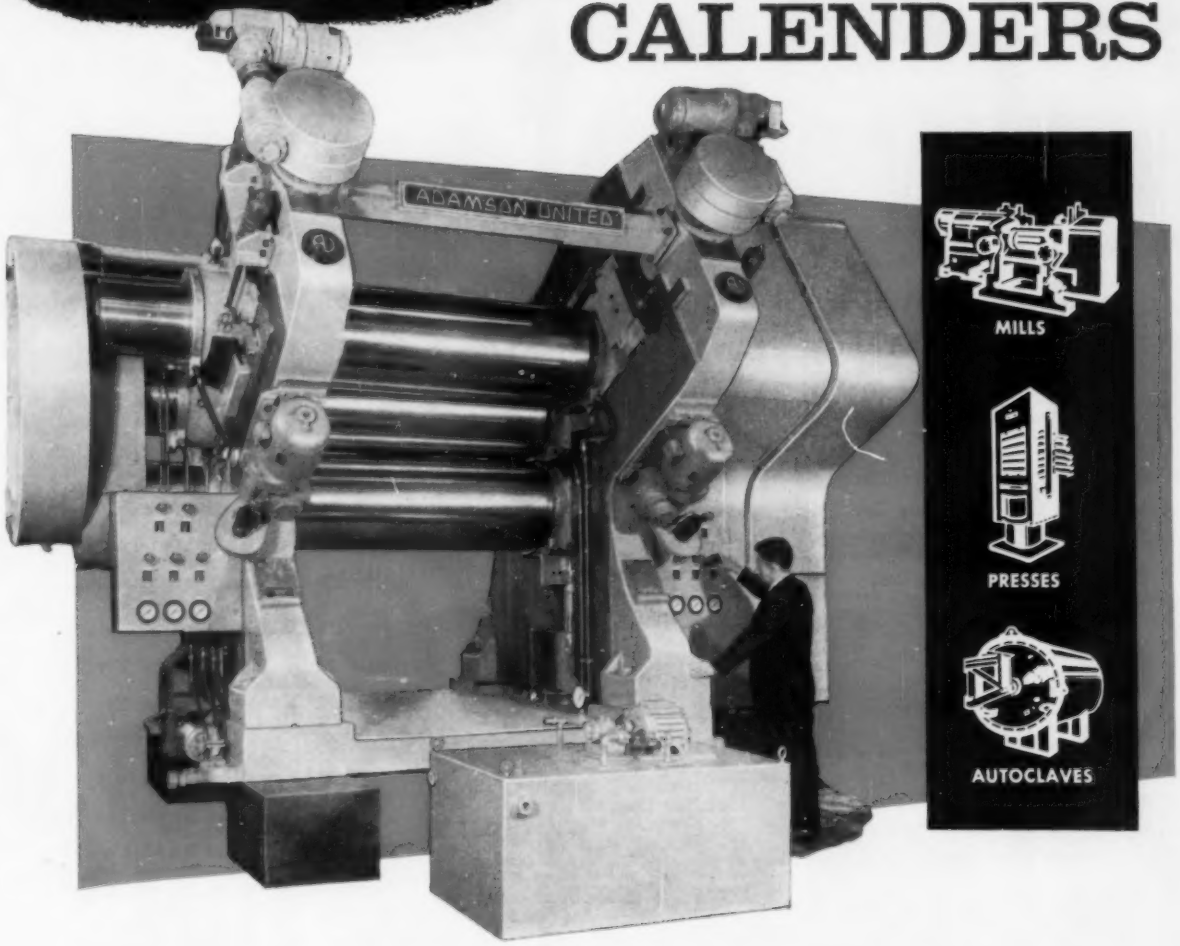
Per inch (or fraction .. $30.00; each 3 inches or fraction (in border) $15.00 extra

Situations Wanted Ads ... 1/3 of above rates

For purpose of establishing rate, figure approximately 50-55 words per inch. For further information address Classified Advertising Department, Modern Plastics, 575 Madison Avenue, N. Y. 22, N. Y. Modern Plastics reserves the right to accept, reject or censor classified copy.

ADAMSON UNITED

PRECISION CALENDERS



Whether the project calls for supplying all mills, calenders, presses and associated machinery for a completely new and modern rubber or plastics plant, or a single unit for a new process, you'll find Adamson United equipment offers the most efficient design and up-to-date operating features for today's production requirements. Our full line of modern rubber and plastics calendering equipment is an outstanding example.

Adamson calenders are skillfully engineered for production of close tolerance, high quality material at high speed. Standard sizes range from 8" x 16" laboratory models to large production units with rolls measuring 36" x 92". Various types include 2, 3 and 4 rolls; vertical, 120 degree, inverted-L, Z-type, cascade, inclined and others. The unit illustrated is a 3-roll, 120-degree, connecting gear-type calender equipped with roll crossing. Adamson calenders are also available with such precision operating features as roll bending, zero clearance, flood lubrication, drilled rolls, anti-friction bearings and pinion-stand drive.

With a complete line of accessory equipment for continuous processing, Adamson United is prepared to handle any rubber or plastics calendering problem you may have. Our engineering staff is at your service — to recommend the unit best suited to your needs, or to develop special equipment to meet your specific requirements. Write or call for complete details — without obligation.

ADAMSON UNITED COMPANY

730 CARROLL STREET, AKRON 4, OHIO

Subsidiary of United Engineering and Foundry Company
Plants at Pittsburgh, Vandergrift, Wilmington, Youngstown, Canton

7076

DESIGNERS AND BUILDERS OF BASIC MACHINERY FOR THE RUBBER, PLASTICS AND PLYWOOD INDUSTRIES

INDEX OF ADVERTISERS

Distribution of this issue: 34,800 **FEBRUARY 1960**

234 Active Mail Order List Co.
259 Adamson United Company
25 Akron Presform Mold Co., The
185 Allen Hollander Co., Inc.
Allied Chemical Corp.,
186 General Chemical Div.
79 National Aniline Div.
117 Semet-Solvay Petrochemical Div.
205 Alpha Chemical and Plastics Corp.
American Cyanamid Company,
235 Dyes Dept.
157 Plastics and Resins Div.
175 Pigments Div.
182 American Latex Products Corp.
75 American Steel Foundries, Elmes Engineering Division
185 Anchor Plastics Co., Inc.
241 Apex Machine Company
59 Argus Chemical Corp.
168 Atlas Electric Devices Co.
252 Aust & Schuttler u Co.

238 B. I. P. Engineering Ltd.
224B Badische Anilin & Soda Fabrik AG.
6 Ball & Jewell, Inc.
253 Barber-Colman Company
32, 33 Battenfeld Machines
64 Bellows Co., The
34 Bethlehem Steel Company
71 Borden Chemical Co., The, Polyvinyl Chloride Dept.
73 Borg-Warner, Marbon Chemical Div.
188 Brabender, C. W., Instruments Inc.
180E British Oxygen Chemicals Ltd.
180G British Resin Products Ltd.

178 Cadet Chemical Corp.
7 Cadillac Plastic and Chemical Co.
225 Carver, Fred S., Inc.
69 Cary Chemicals, Inc.
1 Catalin Corp. of America
8, 9 Celanese Corp. of America, Plastics Div.
180D Chemische Werke Huls
67 Chemore Corp.
40 Chicago Molded Products Corp.
247 Claremont Flock Corp.
249 Clark, Cutler, Mc Dermott Co.
254 Classified
28 Clinton Company, The
215 Columbian Carbon Company
225 Commercial Decal
244 Coating Products, Inc.
253 Conforming Matrix Corp.
228 Consolidated Vacuum Corp.
233 Covema s.r.l.
4 Cumberland Engineering Company, Inc.
160 Crawford & Russell Inc.
241 Custom Scientific Instruments, Inc.

62 Dake Corporation
180F Daniels, T. H. & J., Ltd.
125 Danly Machine Specialties, Inc.
207 Daubert Chemical Company
171 Dayton Rogers Manufacturing Company
181 Deecy Products Co.
193 De Mattia Machine & Tool Co.
70 Detroit Mold Engineering Co.
111 Diamond Alkali Company
du Pont de Nemours, E. I., & Co., (Inc.)
246 Explosives Dept.
57 Pigments Dept.
10, 11 Polychemicals Dept.
143, 144 Polychemicals Dept., Alathon
IFC Durez Plastics Div., Hooker Chemical Corp.

Eastman Chemical Products, Inc.,
151 Chemicals Div.
112, 113 Plastics Div.
154 Economy Engineering
149 Egan, Frank W., & Co.
75 Elmes Engineering Div., American Steel Foundries
82 Emery Industries, Inc., Organic Chemical Sales Dept.
247 Engis Equipment Company
136, 137 Enjay Company, Inc.
229 Erie Engine & Mfg. Co.
12B Erie Plastics
81 Escambia Chemical Corp.

68 Fabricon Products
224A Farbwerke Hoechst AG.
78 Farrel-Birmingham Co., Inc., Watson-Stillman Press Div.
66 Farris Universal Machine Corp.
146 Fellows Gear Shaper Co., The
220 Ferro Corp., Color Div.
187 Fiberite Corporation, The
244 Fine Organics, Inc.
184 Firmaline Products, Inc.
165 Fischer, Johann
248, 263 Foster Grant Co., Inc.
243 Freeman Chemical Corp.
223 Fritzsche Brothers, Inc.
232 Fuji Electronic Industrial Co., Inc.

200, 201, BC General Electric Company,
129 General Mills, Inc.
245 General Public Utilities Corp.
194 General Roll Leaf Manufacturing Co.
42 General Tire & Rubber Co. The, Chemical Div.
17 Gering Plastics Div. of Studebaker-Packard Corp.
133 Glidden Co., The, Industrial Paint Div.
5 Goodrich, B. F., Chemical Co.
13 Goodyear Tire & Rubber Co., The, Chemical Div.
176, 177 Grace, W. R. & Co., Polymer Chemicals Div.
205 Grieve-Hendry Co.

222 Haller, Inc.
196 Harchem Div., Wallace & Tiernan, Inc.
30, 203 Harshaw Chemical Co., The
213 Heinrich, H. H., Co., Reifenhauser KG.
IFC Hooker Chemical Corp., Durez Plastics Div.
169 Houdry Process Corp.
14 Hurlbut Paper Company
12 Hyde, A. L., Co.
21 Hydraulic Press Mfg. Co., The
80 Hysol Corp.

183 Imperial Chemical Industries Ltd., Plastics Div.
232 Improved Machinery Inc.
174 Industrial Research Laboratories
224 Injection Molders Supply Co.
167 Interchemical Corp., Finishes Div.
211 Interplastics Corp.

24 Jefferson Chemical Co.

186 Kato Seisakusho Co., Ltd.
190 Kessler Chemical Co., Inc.
180A Kleestron Limited
204 Kohnstamm, H., & Co., Inc.

234 Lehmann, J. M., Co., Inc.,
37 Lembo Machine Works, Inc.
31 Lester-Phoenix, Inc.
188 Liberty Machine Co., Inc.
218 Logan Hydraulics, Inc.
226 Lucidol Div., Wallace & Tiernan, Inc.
170 Lombard Governor Corp.

237 Makray Manufacturing Co.
227 Mapre S. A.
73 Marbon Chemical Div., Borg-Warner
199 Markem Machine Co.
153 Mearl Corporation, The
147 Meiki Co., Ltd.
154 Merix
53 Metal & Thermit Corp.
247 Metalsmiths
250 Michigan Chrome and Chemical Company
230 Miller Van Winkle Co.
195 Minnesota Plastics Corp.
18 Modern Plastic Machinery Corp.
152 Molded Fiber Glass Co.
209, 217 Monsanto Chemical Co., Plastics Div.
202 Mosinee Paper Mills Co.
261 Moslo Machinery Company
72 Mount Vernon Mills, Inc.
19 Muehlstein, H., & Co., Inc.

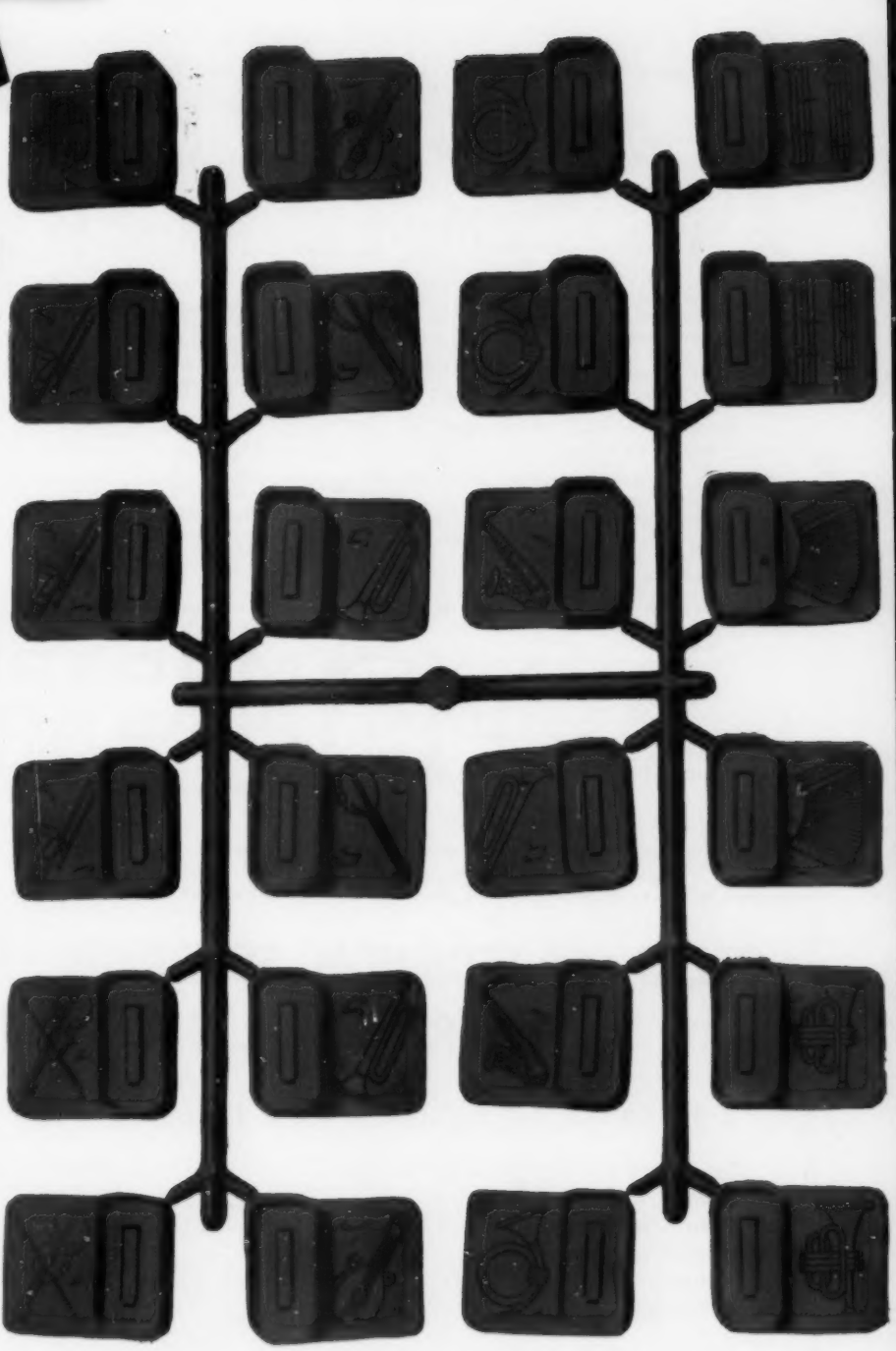
251 N R C Equipment Corp.
79 National Aniline Div., Allied Chemical Corp.
29 National Automatic Tool Co., Inc.
76 National Lead Co.
173 National Rubber Machinery Co.
255 Negri Bossi & C.
65 New England Butt Co.
47 Newbury Industries, Inc.

231 Oerlikon Plastics Ltd.
230 Olsenmark Corporation
170 Orange Products, Inc.
257 Oronite Chemical Co.

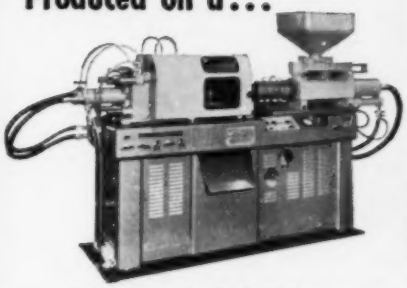
15 Package Machinery Co.
192 Paterson Parchment Paper Co.
180B-C Peco Machinery Sales (Westminster) Ltd.
74 Peerless Roll Leaf Co., Inc.
225 Perforated Specialties Co. Inc.
171 Peter Partition Corp.

(Continued on page 262)

ACTUAL SIZE SHOT—



Produced on a...



Moslo Model 74-2 oz. High Speed Automatic

SEND for ACTUAL SHOT

Here is an injection molding job that "will warm the heart" of custom molders and proprietary molders. Weight of the shot is 24.56 grams and total area is 23.84 square inches; cycle time (gate to gate) 8.5 seconds... all this on a *2 oz. machine.*

Feature for feature, the Moslo 2 oz. Machine is your best buy for production of small pieces. The Model 74 offers high speed, automatic production with lower mold cost. The 4 point toggle clamp together with the famous Moslo cylinder, guarantees unmatched versatility of part production evident in the illustrated shot. Write, phone or wire for an actual shot or send for detailed information on the complete Moslo line.

Shot illustrated was molded by AGP Corporation, Geo. L. Lawrence, President, Peru, Indiana for Cloudcrest Creations, Nashville Indiana

MOSLO MACHINERY COMPANY

MOSLO MACHINERY MMC CO.

2442 PROSPECT AVE. • CLEVELAND 15, OHIO

Manufacturers of **the World's Finest Plastic Injection Molding Machines**

(Continued from page 260)

12A Phillips Chemical Co.
IBC Pittsburgh Coke & Chemical Co., Industrial Chemicals Div.
23 Plastics Engineering Co.
185 Powhatan Mining Company
50, 51 Prodex Corp.
194 Progressive Tool & Die Co.

119 Radio Corporation of America
186 Rainville Co., The
22 Raybestos-Manhattan, Inc.
55 Reichhold Chemicals, Inc.
213 Reifenhauser KG., Heinrich, H. H., Co.
248 Republic Aviation
16 Riegel Paper Corp.
155, 221 Rohm & Haas Co.
174 Rona Pearl Corp.
228 Ross, Charles, & Son Co., Inc.
229 Roussel Corporation
172 Rubber Corp. of America

161 Schulman, A., Inc.
242 Schwartz Chemical Co., Inc.
250 Sealomatic Electronics Corp.
158 Seiberling Rubber Co., Plastics Div.
117 Semet-Solvay Petrochemical Div., Allied Chemical Corp.
139 Shaw, Francis, & Co. Ltd.
38 Shell Chemical Co., Plastics and Resins Division
179 Siempelkamp, G., & Co.
223 Simplomatic Mfg. Co.
222 Sinko Mfg. and Tool Co.
164 Solvic S. A.
60, 61, 162, 163 Spencer Chemical Co.
180 Sprits
191 Standard Tool Co.
204 Sterling Inc.
122, 123 Stokes, F. J., Corp., Plastics Equipment Div.
171 Stowe-Woodward, Inc.
219 Swift & Co.

222 Taber Instrument Corporation
115 Thermatron Electronics Div. of Willcox & Gibbs
180 Thoreson-McCosh, Inc.
44 Titanium Pigment Corporation
140, 141 Triulzi S. A. S.
253 Tronomatic Machine Mfg. Corp.

35, 36 U. S. Industrial Chemicals Co.
262 U. S. I. International
77 U. S. Stoneware, Process Equipment Div.
Union Carbide Corporation
230A, B Union Carbide Int'l Co.
26, 27 Union Carbide Plastics Co. Div.
242 United Cork Companies
126, 131, 174, 239 United States Rubber, Naugatuck Chemical Div.

49 Van Dorn Iron Works Co., The
232 Vernon Specialties, Inc.

Wallace & Tiernan, Inc.
196 Harchem Div.
226 Lucidol Div.
224 Watlow Electric Mfg. Co.
78 Watson-Stillman Press Div., Farrel-Birmingham Co., Inc.
106 Welding Engineers, Inc.
20 Wellington Sears Co.
63 Westchester Plastics, Inc.
190 Whitlock Associates Inc.
168 Williams, C. K., & Co.
180 Wilcox Products Company
159 Windsor, R. H., Ltd.
240 Woloch, George, Co., Inc.
189 Wood, R. D., Company

MODERN PLASTICS

PUBLISHED BY BRESKIN PUBLICATIONS INC. 575 Madison Avenue, New York 22, N. Y.

SALES and TECHNICAL SERVICE REPRESENTATIVES for INTERNATIONAL SALES DIVISION—

U.S. INDUSTRIAL CHEMICALS CO. INTERNATIONAL

has several new position openings in its international sales division headquarters and laboratory in Zug, Switzerland. Excellent opportunities to engage in product sales or customer service work throughout the whole of Europe.

Applicants must speak and write fluent English, and must also speak German or French fluently. Salary commensurate with experience. Exceptional prospects for future promotion.

SERVICE ENGINEERS

Must have a technical education in mechanical or chemical engineering, and specific experience in low density polyethylene. Processing or laboratory experience an advantage.

SALES REPRESENTATIVES

Must have minimum 3 years experience in international sales plus background in thermoplastics industry, preferably in polyethylene.

Please submit detailed resume of education and experience, including current salary to

U. S. I. INTERNATIONAL,

P.O. Box 10, Zug, Switzerland

All replies will be treated in strictest confidence.

The big difference in Foster Grant resin ...

40 YEARS of Successful Plastics Experience

Foster Grant is *one* leading plastics producer that has never lost the ability to understand molders' problems. This is because Foster Grant entered the plastics business in 1919 both as a raw material customer and as a manufacturer of end products.

Through the years, Foster Grant has been successful at merchandising, mold design and machine building. In fact, in 1931, it was Foster Grant who introduced the first successful injection molding machine to America.

In the plastics industry, Foster Grant alone offers a quality line of resins "production tested" in its own molding facilities—many of them pioneered by its own engineers.

The value of this lifetime of successful, first-hand plastics experience is yours to draw on when you mold with Foster Grant resins.

Your Partner in Plastics Progress **FOSTER GRANT**

LEOMINSTER, MASS.

Sales Offices: Chicago
Detroit • New York
and strategically located warehouses

Plants: Leominster, Mass.
Baton Rouge, La.
Manchester, N. H.

Also distributed by:
H. Muehlstein & Co., Inc.
60 East 42nd Street,
New York 17, N. Y.

Branch offices and warehouses:
Akron, Boston, Chicago, Cleveland, Jersey City, Los Angeles

Manufacturers of Fostarene® Polystyrene • Fosta® Nylon • Fosta Tuf-Flex® Impact Polystyrene

EDITORIAL

We need continuing public relations

The public relations-promotional activities of S.P.I. have long been subject to criticism by members, industrial magazines, including MODERN PLASTICS, and by many not directly concerned. Now, recent and completely erroneous newspaper stories concerning infant deaths attributed to film garment bags have heated up new criticism.

For the record, in the first half of 1959, before the "garment bag program" was started, there were 61 such deaths reported; in the second half, 37 were reported and of these only 12 would be accepted as caused by film bags.

Regardless of basic fairness, the criticism continues:

1. S.P.I. is an organization of divisions, and historically, combinations of promotion and public relations have been used on an individual short-term program basis in the interests of wall tile, plastic pipe, reinforced plastics, vinyl film and sheeting and melamine tableware, using outside public relations facilities. These were all small-money projects which certainly could not be defined as public relations. The garment bag program is the first instance in which it was proven that industry could find substantial money to do an educational job.

2. Past S.P.I. public relations committees have been hard-working but cumbersome in size and not confined to public relations experts. They did a good job in spite of their structure —and for free.

3. As plastics sales expand, we will be nudging and stepping on the toes of big entrenched interests such as aluminum, paper, steel, all of whom have big and continuing public relations' budgets and facilities. Furthermore, the jobs to be done on standards, food and drug legislation, building codes are basically public relations tasks for industry as a whole.

It will be good news to all interested that a new, compact and professional public relations committee is being considered, that long-term public relations objectives for the industry are being drawn up and that a study is being made to determine what funds and facilities will be needed.

And it must be recorded in spite of all criticism, that of all the associations and societies concerned with plastics, only S. P. I. has served through public relations the industry beyond the confines of its membership.

Chairman of the board
Charles A. Breskin

President and publisher
Alan S. Cole

Editor
Hiram McCann

Managing editor
Sidney Gross
Frank Murray, *assistant*

Senior editors
R. L. Van Boskirk
A. Paul Peck

Technical editor
Dr. Gordon M. Kline

Engineering editor
George R. Smoluk

Engineering consultant
Dr. James F. Carley

Feature editor
Joel Frados

Associate editor
Guy Bishop

Midwestern editor
Val Wright

Assistant editors
Robert H. Ingham
Janet Giardina

Readers service
Eve H. Marcus

Art director
Donald R. Ruther

Production
Daniel M. Broads, *director*
Verna Retzlaff, *assistant*
Joan Floreno
Harry Baron

Treasurer
Beatrice Grove

Circulation
Robert B. Birnbaum, *director*
George Leiz, *subscription mgr.*

Promotion
Ezra Pincus, *manager*

Business staff
New York 22, 575 Madison Ave.
Tel., PLaza 9-2710
Stuart S. Siegel, *manager*
Perry H. Backstrom
Philip W. Muller
Robert C. Nilson
Benjamin R. Stanton
Theodore B. Breskin
Michael J. Stoller
Bevin Smith
Jack Post

Chicago 11, 101 E. Ontario St.
Tel., DElaware 7-0060
James M. Connors, *vice-president*
William F. Kennedy
Thomas O. McDonough
John Wemple

Cleveland 20, 3537 Lee Rd.
Tel., SKyline 1-6200
Robert C. Beggs
Richard Rogers

Los Angeles 48, 6535 Wilshire Blvd.
Tel., OLive 3-3223
James C. Galloway

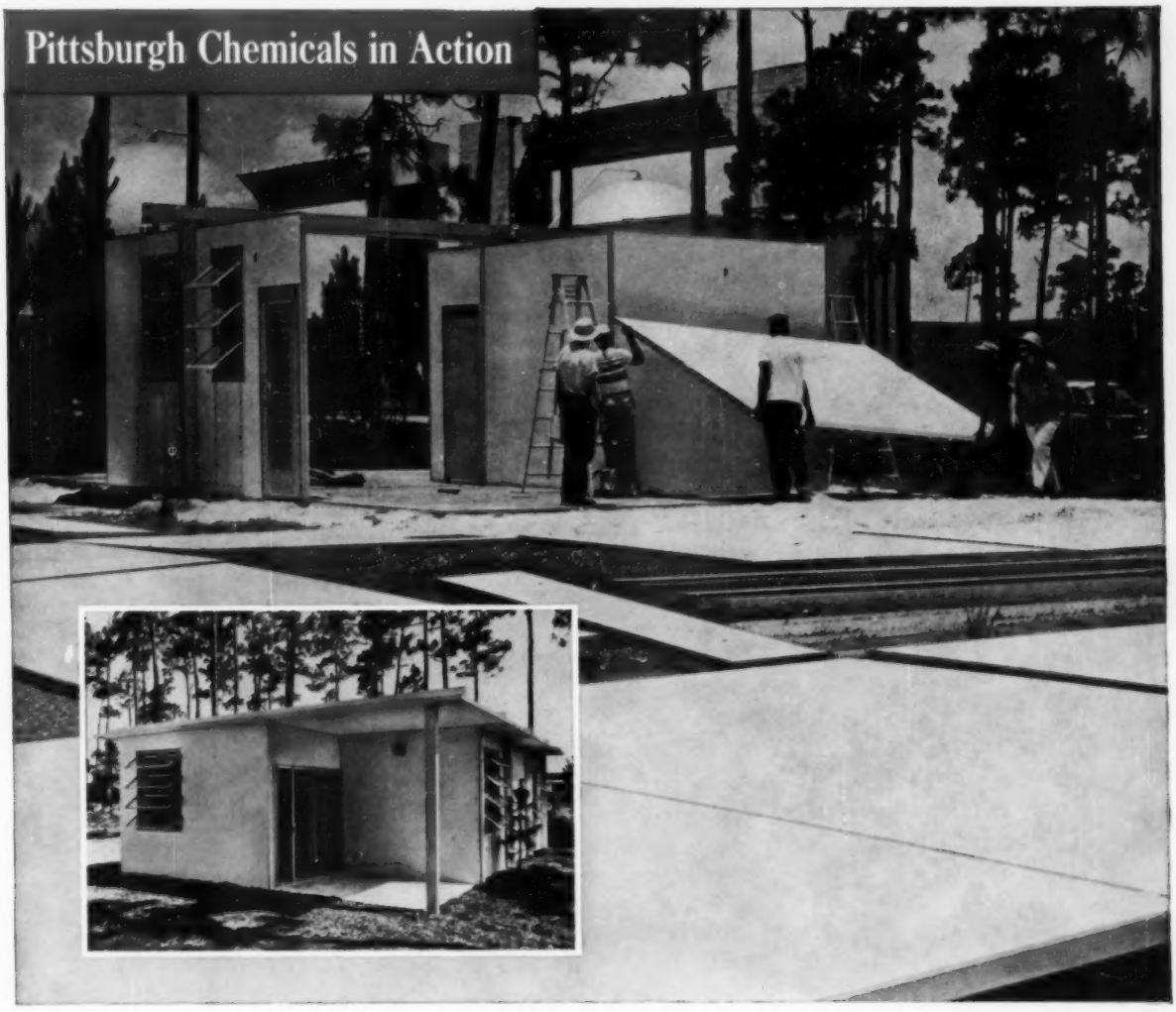
Atlanta 3, 1722 Rhodes Haverty Bldg.
Tel., JAckson 2-8113
Gus Krimsier

London E. C. 4, England
29 New Bridge St.
Tel., CITy 3049
Howard Williams

Frankfurt am Main, Germany
Wittelsbacher Allee 60
Tel., 46 143/46 372
Georg J. Linder

Modern Plastics Executive and Editorial Offices: 575 Madison Avenue, New York 22, N.Y. Tel.: PLaza 9-2710; TWX: NY 1-3063; Cable address: BRESKINPUB.

Pittsburgh Chemicals in Action



Five Men Erected This $2,500 Polyester Home in 5 Hours!

PLASTIC homes and buildings! It's a fabulous plastics market that moves nearer reality as America's building supply manufacturers develop plastic construction panels like the polyester-faced units above. And a growing number of polyester resin manufacturers are relying on Pittsburgh Coke for dependable supplies of high purity maleic anhydride, phthalic anhydride and fumaric acid—three key chemicals used in the production of polyester resins.

The dwelling above is a forerunner in the field. It was pre-fabricated principally from plastic foam panels faced with glass-reinforced polyester sheets. These high strength, lightweight panels rival any conventional materials in weather resistance, ease-of-unkeep and insulating qualities.

Interior partitions, made with honeycomb cores faced with colorful, translucent polyester, are finding growing architectural use, too.

If you make polyester resins, you'll save time and money buying "all three" intermediates from Pittsburgh. Paper work and shipping costs can be reduced . . . and you'll be dealing with one efficient, coordinated sales and technical service team, anxious to meet your delivery requirements and help reduce your processing costs. Call Pittsburgh for *your* next shipment of intermediates!

COAL CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON • FERROMANGANESE

This Smooth, Bondable Phenolic Molding

Metallized with a Lasting Finish

Does the Job Where Appearance and Durability Count

G-E phenolics now offer molders an extra value — the beauty of metallized finishes. This in addition to dimensional stability, heat resistance, strength, machinability, versatility.

In metallizing, the molded piece must be shrink-free, for the coating blows up distortions. The surface must be smooth, bondable. And the molding must be able to take the heat of the metallizing oven. Phenolics fill the bill admirably.

Norco Plastics, Inc., Milwaukee, Wis., is using G-E 12930 Phenolic molding powder to produce the metallized beer tap marker shown above. Richard Geske, Norco sales engineer, tells why:

"The beer tap knob is a tough job. It has to look good for years though it's subject to continuous handling and contact with alcohol. With G-E 12930, we get a smooth surface that gold bonds to tightly for a quality finish."

Many other leading molders are producing specialized parts with G-E 12930. If your shop has a potential metallizing application — or another difficult job — let G-E Technical Service Engineers suggest a G-E phenolic. Call or write to General Electric Company, Section MP-20, Chemical Materials Department, Pittsfield, Mass.

Phenolics-first of the modern plastics ...first in value

GENERAL ELECTRIC